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SECOND ESTIMATE OF BAY AREA HOUSING NEED, 1970

ABAG ASSOCIATION OF BAY AREA GOVERNMENTS

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SECOND ESTIMATE OF BAY AREA HOUSING NEED, 1970

(The Methodology)

prepared by

the Association of Bay Area Governments

Statistics Housing
SF bay area

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16. Abstracts

This report describes a methodology for estimating "housing need" in selected communities of the San Francisco Bay Area, using information from the 1970 Census of Housing. Part I of this report defines terms, states assumptions and notes problems that must be considered when using the methodology. Part II proposes alternative methods for estimating housing need in jurisdictions of varied size categories. Part III puts the housing need estimate into the context of the overall ABAG housing program, describes the acquisition of supplemental Census data and presents a bibliography that could be helpful in future housing studies. The appendices to this report explain in detail the nature of the estimate methodology, with a sample of the data base, a step-by-step explanation of the processes involved, computer program documentation and the final results at the regional level.

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INTRODUCTION

The intent of this project has been to improve and expand ABAG's capacity to provide technical assistance to local governments--a function that takes many forms. In this instance, the focus has been on the improvement of basic housing information necessary to carry out regional policies on housing resources in the San Francisco Bay Area. This is known as the "Second Estimate of Bay Area Housing Need, 1970."

Incentive for the development of a "Second Estimate" resulted from a detailed analysis of a similar study completed by ABAG in October 1973--called "Estimate of Housing Needs: San Francisco Bay Area, 1970" (the "First Estimate"). Limitations inherent in the data base for that study required the use of techniques that have since proved inadequate for the needs of housing planners at the regional and local level.* An improved methodology for estimating housing need in the Bay Area was needed. The Association of Bay Area Governments (ABAG) obtained a supplemental grant (701 Comprehensive Planning) through the California State Office of Planning and Research in December 1974 to refine its housing need estimate methodology and generally improve ABAG's housing data base. This report describes that effort.

A. OBJECTIVES

1. To develop an estimate of Bay Area housing need (using data from the 1970 Census of Housing) based on the status of two factors pertaining to owner and renter housing units: physical condition of the unit and the occupancy ratio (persons per room). Supplemental information should include an assessment of "overpaying renter households." The concept should also include assumptions regarding the reallocation of households inadequately housed and the need for each locality to allow for a percentage of standard vacant housing for the purpose of resident and non-resident mobility.

2. To support the development of ABAG's Regional Housing Element (a component of the ABAG Regional Plan), which will contain goals, objectives and policies toward the provision of ". . . the opportunity for all persons in the Bay Area to

*For details, see an ABAG memo to files entitled: "Problems with the First Estimate," dated September 3, 1975.

obtain adequate shelter convenient to other activities and facilities, in neighborhoods that are satisfying to them."*

3. To use the Second Estimate as input for the development of a formula for the regional allocation of low- and moderate-income housing resources to enable each Bay Area jurisdiction to provide an equitable portion of such housing.

4. To make the Second Estimate available to local governments for their use in housing planning activities.

5. To develop information that can be used in ABAG's review and comment on local policies and programs dealing with housing for low- and moderate-income households. An example of such use is ABAG's review and comment on block grant applications (i.e., Housing Assistance Plans) under the Housing and Community Development Act of 1974.

B. ORGANIZATION OF THE REPORT

Part I of this report describes the concepts and assumptions in the Second Estimate's methodology. The data base is a special tabulation from the 1970 Census of Housing that applies to cities and places of 25,000 or more population and totals for the nine Bay Area counties. Housing need is measured on the basis of physical condition of the housing units and occupancy ratio (persons per room). "Overpaying" for rental households is defined. Assumptions regarding the kind of matrix used in the study, the concepts of standard housing resources, mobility vacant units and overhousing are explained. A brief summary of the methodology is presented for those who do not wish to read the detailed explanation found in Appendix 2. Local remedies to "fill" the housing need are discussed. Part I also includes an explanation of factors that should be considered when applying the methodology.

Part II of this report explains housing need estimate methodologies considered for cities and places with less than 25,000 population in 1970. Variations in the census' reporting of housing data made it necessary to divide jurisdictions into three size categories. The largest size category (25,000 or more population) was dictated by the limitations of the Second Estimate. Two other categories were established on the basis of data availability. A methodology for "small communities" (1000-2500) population was developed and applied. Alternative methodologies are suggested for "medium size communities" (2500-25,000 population), but have not been applied.

*Regional Plan 1970:1990, Association of Bay Area Governments, July 30, 1970.

Part III of the report discusses how the Second Estimate will contribute to improvement of ABAG's technical capacity in the housing field. Its role for the immediate future clearly is identified in the goals and objectives of ABAG's recently approved Regional Housing Element - Phase I. Two additional aspects of the project described in Part III include the acquisition of the Sixth Count Housing Tape and the development of a bibliography regarding the updating and forecasting of housing need estimates. Both of those items are important to the development of future ABAG housing studies.

Appendices 1, 2, 3 and 4 contain detailed information on the application of the Second Estimate Methodology. This package would be of greatest interest to those who may replicate or adapt the methodology for their area. Appendix 1 is a sample of the special tabulation printouts. The information from those tables are the input data for the Second Estimate's computer program. Appendix 2 is a detailed, step-by-step explanation of the processes that occur in the computer program. Appendix 3 presents computer program documentation. Appendix 4 contains computer printouts of the input/output matrices developed by the computer program. The printouts summarize the results for the San Francisco Bay Area in 1970.

C. LIMITATIONS

Development of the Second Estimate Methodology was conducted recognizing a set of assumptions and limitations that readers must bear in mind when considering possible use or adaptation of the methodology's results. This is not a housing market analysis. This study will not tell a locality how many of its existing housing units can be rehabilitated or how much it will cost to rehabilitate or convert existing housing. While there is an assessment of the number of overpaying rental households, a dollar amount of needed subsidies for rental assistance is not determined. The geographic location of needed housing within city limits cannot be specified. Those are issues that must be examined by local governments, in accordance with local policies and criteria.

PART I

HOUSING NEED CONCEPTS

A. DATA BASE

The U.S. Census of Housing 1970 is the source of data for the Second Estimate of Bay Area Housing Need methodology. It is the most comprehensive source of housing information available for all parts of the region and is recognized by all levels of government for use in the measuring of a jurisdiction's socioeconomic status for each census year. Census data is used in the allocation of Federal funding under programs like general and special revenue sharing.

Special tabulations of data can be ordered from the Census Bureau.* There is cost and a significant time period involved, but the ability to obtain a data base suited to the needs of special studies has made this project possible.

The primary disadvantage of the census is that it only reflects the housing situation for April 1970. Many changes have occurred since then, and the results of this study will not be truly reflective of housing problems as they exist today. The updating of housing information for the Bay Area is recognized as being of the utmost importance. Completion of this study will provide a reliable 1970 base year assessment for future efforts to update and forecast the housing situation in this area.

Other data sources, such as the public utilities, State Department of Finance, Department of Housing and Urban Development (HUD), private research firms, etc., have information that could be very useful in a housing need study. Because of inaccessibility, or incomplete coverage of the geographic area in question, however, those sources were not used for the project. Hopefully, they can be of value in future housing studies.

A Special Census Tabulation, prepared by and purchased from the Bureau of the Census, provided data for cities and places of 25,000 or more population, plus totals for the nine Bay Area counties. It arranged the data in cross-tabulations which made it possible to classify housing situations into very basic categories and was used as input for the computer program that implemented the study. Figures 1 and 2 present

*U.S. Department of Commerce, Bureau of the Census, 1970 Census User's Guide, Part I, issued 1970. Page 33.

Figure 1.

Special Census Tabulation

Table I. Count of Owner-Occupied Units:

by Value (3)	less than $19,999 $20,000 - $34,999 $35,000 or more*	
by Number of Rooms (6)	1 room 2 rooms 3 rooms 4 rooms 5 rooms 6 rooms or more	
by Plumbing (2)	Standard	= with all plumbing facilities
	Substandard	= lacking one or more plumbing facilities
by Heating (2)	Substandard	= not heated; fireplaces, stoves or portable room room heat only; room heaters without flue
	Standard	= all other heating equipment
by Number of Persons (6)	1 person 2 persons 3 persons 4 persons 5 persons 6 persons or more	

*The value category "$35,000 or more" includes: cooperatives, condominiums, owner-occupied multiple-unit dwellings and owner-occupied, single-family dwellings on ten or more acres of land.

Table II. Count of Renter-Occupied Units:

by Gross Rent* (3)
- less than $99
- $100 - $199
- $200 or more

by (See Table I) Rooms (6); by Plumbing (2); by Heating (3); by Number of Persons (6)

by Gross Rent as Percentage of Income (3)
- less than 24 percent
- 25 - 34 percent
- 35 percent or more

Table III. Count of Vacant-for-Sale Units:

by Value (3); by Rooms (6); by Plumbing (2); by Heating (2)

Table IV. Count of Vacant-for-Rent Units:

by Asking Rent (3); by Rooms (6); by Plumbing (2); by Heating (2)

Table V. Count of Owner-Occupied Units:

by Value (3); by Rooms (6)

by Number of Bedrooms (5)
- No bedroom
- 1 bedroom
- 2 bedrooms
- 3 bedrooms
- 4 bedrooms or more

Table VI. Count of Renter-Occupied Units:

by Gross Rent (3); by Rooms (6); by Bedrooms (5)

*This category excludes those units paying "No Cash Rent."

Figure 2.

Special Census Tabulation - Cities and Counties

I. San Francisco - Oakland SMSA

Alameda County -	Alameda, Berkeley, Castro Valley (unincorporated), Fremont, Hayward, Livermore, Oakland, Newark, San Leandro
Contra Costa County -	Antioch, Concord, El Cerrito, Richmond, Walnut Creek
Marin County -	Novato, San Rafael
San Francisco County -	San Francisco City
San Mateo County -	Burlingame, Daly City, Menlo Park, Pacifica, Redwood City, San Bruno, San Carlos, San Mateo, South San Francisco

II. San Jose SMSA

Santa Clara County -	Los Altos, Milpitas, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, Sunnyvale

III. Santa Rosa SMSA

Sonoma County -	Santa Rosa

IV. Vallejo - Fairfield - Napa SMSA

Napa County -	Napa
Solano County -	Fairfield, Vallejo

the information made available through the special tabulation (See Appendix 1 for a sample printout).

B. MEASURING HOUSING NEED

"Housing Need" in this study is partially determined by the status of two factors in each housing unit: housing condition and occupancy rates (persons per room). Occupied housing units where the housing condition is "substandard" and/or where the unit is "overcrowded" make up the number of "households inadequately housed." The inadequately housed are then matched with appropriate existing standard housing. Those households that are not matched, plus an allowance for standard vacant units for mobility purposes, represent the housing need for newly built or rehabilitated housing by size and cost.

Housing Condition is measured in terms of the status of heating and plumbing facilities in each housing unit. The facilities are classified as standard or substandard* and occur in any given unit in one of the following situations:

a. substandard heating and substandard plumbing

b. substandard heating and standard plumbing

c. standard heating and substandard plumbing

d. standard heating and standard plumbing

If situation (a), (b), or (c) exists, the unit is "substandard." If situation (d) exists, the unit is "standard."

Overcrowding occurs when the number of persons in a household exceeds the number of rooms in the housing unit. That is consistent with the standard of 1.01 or more persons per room used in the First Estimate methodology** and with the standard applied by the Department of Housing and Urban

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*substandard heating = room heaters without flue; fireplaces, stoves, or portable room heat only; not heated.
standard heating = all other heating equipment.
substandard plumbing = lacking one or more plumbing facilities.
standard plumbing = with all plumbing facilities.
Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census User's Guide, Part II, October 1970.

**Estimates of Housing Needs, San Francisco Bay Area 1970, Association of Bay Area Governments. October 1973.

Development in its allocation formula for the distribution of Community Development Block Grants.* Housing units where the number of persons is equal to or less than the number of rooms are classified "not overcrowded."

Overpaying is a situation where shelter cost exceeds a reasonable portion of household income. For rental housing, the standard of twenty-five or more percent of household income going to gross rent (contract rent plus utilities) will be used. That is consistent with the percentage figure used in the First Estimate and with the standard adopted in Title II (Assisted Housing) of the Housing and Community Development Act of 1974.**

There will be no measurement of "overpaying" for owner-occupied units in this study. The nature of shelter costs for owner housing is dependent on many variables: mortgage amount, interest rate, term of mortgage, insurance costs, etc. Determining true owner housing costs is further confused when income tax deductions for interest and property taxes are considered. There was no question in the 1970 Census that asked for owners' monthly housing costs.

In the First Estimate, overpaying was included as a factor in determining the total renter housing need. The count of renter households overpaying will be included as a separate part of the output for the Second Estimate. Households overpaying only will not be included as a part of the final output showing the estimate of housing need. That makes the renter need estimate comparable to that of the owner need estimate (which was not the case in the First Estimate).

The identification of overpaying households is an important process because of the impact it can have on the approach taken by a locality to solve its housing problems. As ABAG's First Estimate of housing need and other studies*** indicate, the largest portion of rental need is composed of overpaying households. The quantification of the extent of this problem helps a locality decide if it must place its greatest efforts on providing income or rental supplements, or a program more oriented to construction and rehabilitation to provide additional standard housing units.

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*Housing & Community Development Act of 1974, Title I, Sec. 102(a)(9).

**Housing & Community Development Act of 1974, Title II, Sec. (3)(1).

***See, for example, Quantitative Housing Needs, Sacramento Regional Area Planning Commission, June 1974; and America's Housing Needs: 1970 to 1980, Joint Center for Urban Studies of the Massachusetts Institute of Technology and Harvard University, December 1973.

C. ASSUMPTIONS IN THE METHODOLOGY

Rooms Matrix vs. Bedrooms Matrix. The standard unit of measure for the Second Estimate of Bay Area Housing Need is the "Room x Value/Rent Matrix." All calculations in the Second Estimate are made by adding or subtracting corresponding cells of the matrices in question.

There are six categories of rooms-per-unit in each matrix. They make up the horizontal axis of the matrix and go from one-room units to units of six or more rooms. The vertical axis of the matrix has three categories of value or gross rent, depending on whether the units are owner- or renter-occupied.

For the purpose of this analysis, it is better to use a "rooms matrix" than a "bedrooms matrix." The reason is that the measurement of overcrowding is based on the relationship of persons occupying the unit and the number of rooms in the unit. To determine the minimum need (in terms of unit size) for the household of a currently overcrowded housing unit, it is important to know the number of rooms needed to alleviate the overcrowded condition; using 1.01 or more persons per room as the standard for overcrowding, there should be a direct relationship (one-to-one) between the number of persons and the number of rooms to achieve the minimum unit size for the household.

The use of a "Bedrooms by Value/Rent Matrix" relates more to standard market practices in the construction, sale and rental of housing units. Units are normally advertized as "one- or two-bedroom units," etc. In this study, there will be five bedroom categories: zero bedrooms to four or more bedrooms per unit. HUD standards for various subsidies are also established in terms of units by number of bedrooms.

Composition of the household is another reason for looking at units in terms of bedrooms. Two families of four could require two different sizes of unit. A married couple with two children of the same sex could theoretically get by in a two-bedroom unit, whereas a married couple with two children--one of each sex--would theoretically (because of cultural standards) require a three-bedroom unit. The distribution of housing need for families and households by size and composition would be difficult to determine, with the type of information currently available. It is an issue probably best dealt with at the local level, anyway.

After Second Estimate outputs are completed using rooms by value/rent matrices, conversion of selected outputs to bedrooms by value/rent matrices is made. The conversion is made following the assumption that the distribution of

housing units by bedrooms per unit after the analysis of an area's housing stock will be the same as it was prior to the analysis. In other words, the portion of two-bedroom units that are four-room units, or three-bedroom units that are five-room units, etc., will be the same after the need estimate is made as it was according to the 1970 census data prior to the application of the Second Estimate methodology.

Available Standard Housing Resource. It is assumed that there exists in each area a "standard housing resource," composed of physically standard, vacant housing units and physically standard, overcrowded housing units. It is further assumed that this standard housing resource can be used to meet a portion of an area's housing need. These assumptions imply the systematic vacating and reoccupation of standard housing units which, in reality, would be difficult--if not impossible--to achieve. However, the abstract nature of these estimates focuses on the objective of providing a total supply of standard housing matching the needs of all households. If an adequate supply of standard housing were available in the right size and price categories, a situation would be created where overcrowded households would have the opportunity to move to larger units, creating vacancies for smaller overcrowded households.

Mobility Vacant. A minimum number of standard vacant housing units in all size and price categories is necessary for purposes of internal and external mobility. For local residents, vacant units provide the opportunity to move to a new or improved housing situation within the area as their needs change or grow. Such units also serve as a means of helping to stabilize the increases in rents and asking prices for homes (partially a function of supply and demand). The vacant units also allow non-local residents to move into the area, contributing to local growth. As the total number of occupied housing units increases, so should the number of standard vacant units. For owner-occupied units, it is assumed that a 1% vacancy factor is necessary in each size and price category; for renters, a 4.5% vacancy factor is necessary.* Those are the same vacancy factors that were applied in the First Estimate.

Overhousing. As used in this report, "overhousing" is a situation where a housing unit has less than one person per room. An extreme example of overhousing would be one person living in a housing unit of six or more rooms. In our use of the term "overhousing," we have not meant to infer any value judgments; there is certainly nothing illegal or hazardous associated with such a situation. Further, it is improbable

*Those figures concur with standards used by the Federal Home Loan Bank Board when issuing "market alerts" to mortgage lenders to declare that a state of high vacancy exists in a given market area.

that most of those households currently overhoused would be willing to vacate their current premises for a situation where the occupancy ratio is one person per room. For the purposes of this study, it is assumed that overhousing in existing standard occupied housing units should be allowed to remain.

D. SECOND ESTIMATE METHODOLOGY

The aim of the Second Estimate methodology is to develop "basic matrices" that sort the housing stock into the possible situations in which housing units can be found, in terms of housing condition and occupancy rates. Because the "basic matrices" take into account the possible "overlap" that can occur between the housing characteristics (see "Measuring Housing Need"), estimating the housing need for any given locality becomes a series of relatively simple calculations--adding the various categories of need and matching that need with standard housing resources. The deficit resulting from that match is the estimate of housing need for the given jurisdiction. A sample of the data base for the methodology can be found in Appendix 1.

A detailed explanation of the processes in the Second Estimate Methodology is presented in Appendix 2. Housing planners and computer programmers who might reproduce or adapt this methodology for their area should review the appendices thoroughly as they contain step-by-step descriptions of the processes that were developed to apply the methodology's assumptions. Appendix 3 contains documentation of the computer program that was developed for this study at the Lawrence Berkeley Laboratory. In Appendix 4, program output for the Bay Area's housing need estimate is presented as a sample of the methodology's application.

E. LOCAL REMEDIES TO "FILL" THE NEED

The term "housing need" is not meant to imply that an area needs to build a specific number of new housing units to adequately house its residents. In addition to new construction, rehabilitation or conversion of existing structures is an approach that should be strongly considered as a strategy to fill housing need. Rehabilitated and converted units become, in a sense, "new" standard housing units to adequately house their current occupants or other poorly housed residents of the area. Rent subsidy programs can also help to fill some of the need by allowing a community to use standard vacant units that may cost more than needy households can afford to pay.

A certain portion of the existing substandard housing units can serve as a potential resource for filling housing need. There may be a good number of rehabilitable or convertable units among them. The data available from the Second Estimate will make clear the number of substandard units by size and cost to aid each area in making an assessment of such potential. If a strictly new construction approach were taken, those substandard units would not serve any purpose other than as designations for demolition activity.

Filling an area's housing need does not necessarily mean new growth or increased density. It is conceivable that a community's entire housing need can be filled via rehabilitation and shelter cost subsidy programs. The potential for solving housing needs problems may rest entirely with an area's existing stock. The extent to which growth or increased density occurs as a result of filling housing need is therefore greatly influenced by decision-making at the local level.

F. PROBLEMS WITH THE SECOND ESTIMATE

As with all studies of this type, there are limitations to what this methodology allows one to conclude about the data that is produced. The methodology overcomes certain problems found in the First Estimate and provides for greater accuracy in the conclusions made. But the Second Estimate also creates new problems of interpretation and is not able to address other problems found in the First Estimate. This section of the report identifies problems inherent in the Second Estimate to give readers and possible users an accurate perspective from which they can view its potential.

Criteria for Physical Condition. The use of the two factors (plumbing and heating facilities) to determine the physical condition of the housing stock has been questioned by many housing researchers since the release of the 1970 Census housing statistics.* There were no questions in the 1970 Census directly relating to the condition of housing. Housing units were not classified as being in "sound, deteriorated, or dilapidated" as in the 1960 Census. That was done for good reason. It was found that such subjective descriptions lead to many interpretations by Census enumerators and that the estimates of substandard housing stock in 1960 were grossly inaccurate.

*At a recent census planning conference held in the Bay Area which ABAG cosponsored (PLANNING AHEAD FOR THE 1980 CENSUS, Technical Workshops--May 21, 1975), the Chief of the Bureau's Housing Division described the many problems associated with census efforts to determine housing conditions.

The use of housing units lacking one or more plumbing facilities and/or lacking standard heating facilities as the criteria for substandard housing probably underestimates the true number of substandard housing units in existence at the time of the 1970 Census. Those factors are only assumed to be surrogate measures for purposes of the estimate. It is likely that there are housing units lacking standard plumbing or heat-int that could still qualify as standard units for human habitation. Resident hotels (where plumbing facilities are often shared) are an example of such a situation.* It is further possible that there are units which have standard heating and plumbing facilities that would be considered sub-standard because of other structural problems (e.g., unsafe electrical systems, sagging ceilings, deteriorating walls) or massive rodent and insect infestation. The Census does not have information that can give an accurate picture of the occurrence of such conditions. It is felt that plumbing and heating facilities are the best available factors, given the limited amount of detailed housing information available. To gain a truly accurate count of substandard housing, localities must take it upon themselves to complete on-site inspections of their area's housing stock.

Age of Data. Another problem unresolved by the Second Estimate is the fact that the data base for the study was collected in 1970. As of the publication of this report, the information is over five years old. The total count of housing units in the Bay Area has no doubt increased in that time period.

The value or gross rent of most units has increased dramatically in recent years. Some of the "substandard" housing stock has been removed from the market by means of rehabilitation, conversion, or demolition. Other units have since declined physically. There has probably been a good degree of change in the makeup of the housing stock within subareas of the region in the past half-decade.

The major obstacle toward updating housing information at the regional level is that detailed current information is not compiled on the same basis across the region. Some cities and counties in the Bay Area have made efforts to update their housing data (through housing elements or Housing Assistance Plans). But those studies and surveys have been carried out at different times, for different reasons, using different measurement criteria.

A mid-decade Census is being carried out by a number of Bay Area cities and counties, but not all such jurisdictions

*The City of San Francisco has a large number of resident hotels with units that would be classified substandard under this study which may, in fact, be quite habitable.

are involved. The dates of the censuses vary during 1975 and 1976. Only a few of the questions being asked about housing are similar. Updating the regional housing data base is a major task. It is needed and will be attempted, but certainly will not be an easy undertaking.

Underestimate of Overcrowding. The nature of the Second Estimate methodology has made it impossible to directly determine the number of overcrowded households among households of six or more persons, living in housing units of six or more rooms. A solution to that problem has been devised that will make it possible to estimate the number of overcrowded units in that category for counties and cities of 50,000 or more population by using data from the Sixth Count Housing Tape. For cities and places of 25,000 to 50,000 population, the same method using data from the First Estimate was used to make corrections.

Overpaying. There has been no attempt to estimate overpaying for owner-occupied housing (that was true for the First Estimate). The factors involved in that interpretation are too many, and any figures produced would be highly questionable.

The count of households overpaying in renter-occupied units (using 25% or more of income for gross rent as the criterion) does not indicate those who are "voluntarily overpaying." There may be households in the upper income levels that can afford and do pay in excess of 25% of their income for gross rent, without having to forego other essentials such as food, clothing or health care. To make such a distinction would require a data base much more detailed than is obtainable without a great problem with estimate variability and data suppression.

Reallocation. The reallocation concept within the methodology is based on assumptions that can vary according to the user's ultimate goals. For purposes of this study, inadequately housed households are "reallocated" to standard housing units of the same value or rent levels, where an occupancy ratio of one person per room will exist (see Appendix 2, processes 6 through 9). The goal has been to estimate the total standard housing stock that would be necessary to adequately house a jurisdiction's resident population and provide for a degree of mobility. There has been no attempt to change value or rent levels because there is no accurate picture of the potential of households to afford housing at other value or rent levels. Local jurisdictions have much better access to current rent and value levels for their areas. A regional evaluation using the data available for this study would be of little use to the localities or the region.

A further assumption implied in the reallocation concept is the absence of locational restrictions in the matching process. Without such restrictions, one could assume that a housing deficit in one part of a city could be matched to a housing surplus in another part of the city. Residential settlement patterns in the "real world" are not that flexible. No matter what the price or condition of housing, there are certain areas of some communities where certain groups will not reside. This phenomenon is almost impossible to deal with in methodologies like the Second Estimate. Information regarding resettlement varies for each jurisdiction and could be the topic of an entire separate study.

Finally, the reallocation concept did not allow for overhousing of matched households (e.g., three-person households in four-room units). That resulted in a residual of standard vacant units that were "unused" for matching or mobility purposes. The residual is accounted for in an output matrix called "Excess Standard Vacant$_2$" (see Appendix 2) and could be taken into consideration when evaluating each jurisdiction's estimate of housing need.

It is recommended that the reader accept or reject the reallocation aspect of this methodology (in whole or in part) on the basis of its similarity to the reader's goals for his or her jurisdiction.

Matrix Conversion. Comparison of some equivalent rooms and bedrooms matrices may show a different total number of units in each matrix, where in theory they should be equal. This is a problem inherent in the conversion process (see Appendix 2) where successive rearrangement of data in matrix cells sometimes makes it impossible to account for all the units in the matrix being converted. The likelihood of this apparent "loss" of units becomes greater as the size of the jurisdiction gets smaller. The net effect of this problem is a reduction in the reliability of the bedrooms matrix as an accurate reflection of the analysis that was carried out on a rooms matrix level. In situations where there are differences between totals from rooms and bedrooms matrices, the rooms matrix should be considered the correct total.

PART II.

METHODOLOGIES FOR CITIES AND PLACES WITH LESS THAN 25,000 POPULATION, 1970

A. REASONS FOR DIFFERENT METHODS

An examination of available base data has revealed that it will be necessary to develop three methodologies to estimate housing need for the three categories of cities and places, as defined by the size of a city's 1970 population. That is because the Census does not report out housing data at the same levels of detail for all sizes of jurisdiction.

Cities and places of 1000 to 2500 population were not included in the First Estimate because the data base (Fourth Count Summary [Housing] Tape) for that study had no information for areas of that size. A method employing the Second Count Summary Tape, which has some data for these "small communities," will be developed and explained.

Cities and places of 2500 to 25,000 population were included in the First Estimate so there is at least one existing methodology to consider as an alternative. The ceiling of 25,000 population for this category was determined by the lower limits of the special tabulation of census data obtained from the Census Bureau. Additional methods applying the Second and Fourth Count Summary Tapes to this size category will be developed and considered for their usefulness.

B. HOUSING NEEDS ESTIMATE METHODOLOGY FOR SMALL COMMUNITIES (1000 to 2500 POPULATION, 1970)

The First Estimate did not include an assessment of the housing need in communities with 1970 populations of 1000-2500 people. Its methodology prevented use of any other available census data because the degree of detail required would have caused too great a problem with data suppression. It is unfortunate that need estimates could not be calculated for small communities in the first study. Four of the twelve areas involved are incorporated cities and three of those four are ABAG members.

A methodology has been devised that will allow comment on the housing status of these "small communities" given certain

limitations. These estimates are not directly comparable to the estimates of larger areas, but to as great an extent as possible the same criteria and assumptions about the determination of housing need have been applied. There are five major differences between the methodology for estimating housing need for "small communities" and the methodologies used for the remainder of the Bay Area.

1. The methodology for "small communities" uses the 1970 Second Count Summary Tape (tabulations 46, 52 and 65 for owners; tabulations 47, 53 and 66 for renters) instead of the 1970 Fourth Count (Housing) Summary Tape as its data base. The Second Count provides information for communities down to the 1000-2500 population level on a 100% sample basis. The Fourth Count Tape covers areas with 2500 or more population on a 20%, 15% and 5% sample basis.

2. Need estimates are calculated on a one-dimensional matrix basis. The two matrices are owner-occupied or vacant-for-sale units by value and renter-occupied or vacant-for-rent units by contract rent. The basic matrices for the other methodology are for owner units by value by rooms per unit and renter units by gross rent by rooms per unit.

   The reason for using one-dimensional matrices instead of two-dimensional matrices is that the Second Count can only provide two- and three-way cross tabulations, which make it impossible to develop the larger matrix as a unit of measurement.

3. There are fewer factors involved in estimating need for small communities because of the less detailed data base. The other methodologies take into account factors such as plumbing, overcrowding and heating. The "small communities" methodology can only take into account plumbing and overcrowding as a basis for estimating housing need.

4. The "small communities" methodology only goes as far as estimating "households needing housing." The methodology for the larger areas goes beyond that point by "reallocating" needy households into a standard housing resource and estimating the number of housing units that need to be built or rehabilitated to adequately house all of the resident population and provide specified vacancy rates in standard housing.

5. The Second Count Tape does not have a tabulation that indicates percent of income paid for rent, so it is not possible to determine "overpaying" for renter-occupied units. The methodology for larger areas does make an assessment of overpaying for renters and shows that data as a separate aspect of housing need.

The housing need estimate formula for small communities is quite simple. With the data available from the Second Count Summary Tape, it is possible to segregate housing need into three separate categories:

a. households in units with all plumbing facilities and with 1.01 or more persons per room (WAP/OVCR);

b. households in units lacking one or more plumbing facilities and with 1.01 or more persons per room (LAP/OVCR);

c. households in units lacking one or more plumbing facilities and with less than 1.01 persons per room (LAP/$\overline{\text{OVCR}}$).

The determination of Households Needing Housing (for owners and renters) is a simple addition of those three categories for each area:

$$\text{WAP/OVCR} + \text{LAP/OVCR} + \text{LAP/}\overline{\text{OVCR}} = \text{Households Needing Housing}$$

Figure 3 presents the format in which the data has been used and the specific sources within the data base that were used in making the need estimates.

C. ALTERNATE HOUSING NEED ESTIMATE METHODOLOGY FOR MEDIUM-SIZE CITIES (2500 to 25,000 POPULATION, 1970)

There are three approaches to estimating housing need for cities and places of 2500 to 25,000 population, 1970, that seem within the realm of achievement.

Method I: Small Communities Approach. In essence, this approach applies the method for estimating housing need for small communities described above. The estimates are made on a one-dimensional matrix basis (owners by value and renters by contract rent). The determinants of

FIGURE 3: HOUSING NEED ESTIMATES FOR SMALL COMMUNITIES (SAMPLE)

	OWNER-OCCUPIED OR VACANT-FOR-SALE												
	UNIVERSE			WAP			LAP			LAP/ OVCR	LAP/ OVCR	LAP/ OVCR	HOUSEHOLDS NEEDING HOUSING
Value ($)	occ.	vac.	total	occ.	vac.	total	occ.	vac.	total				
Less than 5000	6	0	6	4	0	4	2	0	2	0	1	1	2
5000-9999	11	1	12	10	1	11	1	0	1	1	0	1	2
10,000-14,999	34	0	34	31	0	31	3	0	3	0	2	1	3
15,000-19,999	30	1	50	48	1	49	1	0	1	0	0	1	1
20,000-24,999	48	6	54	46	4	50	2	2	4	2	0	2	4
25,000 +	83	6	89	83	6	89	0	0	0	5	0	0	5
Total	231	14	245	222	12	234	9	2	11	8	3	6	17
	RENTER-OCCUPIED OR VACANT-FOR-RENT												
Contract Rent ($)													
Less than 40	14	1	15	14	1	15	0	0	0	1	0	0	1
40-59	11	1	12	11	0	11	0	1	1	3	0	0	3
60-79	16	0	16	16	0	16	0	0	0	3	0	0	3
80-99	17	1	18	14	1	15	3	0	3	0	0	3	3
100-149	19	3	22	17	2	19	2	1	3	5	0	2	7
150 +	8	0	8	7	0	7	1	0	1	1	1	0	2
WCR	17	0	17	17	0	17	0	0	0	1	0	0	1
Total	102	6	108	96	4	100	6	2	8	14	1	5	20

Definitions:

Universe	Total units
WAP	Units with all plumbing facilities
LAP	Units lacking one or more plumbing facilities
OVCR	Units with 1.01 or more persons per room
$\overline{\text{OVCR}}$	Units with less than 1.01 persons per room
occ.	Occupied
vac.	Vacant
WCR	Without cash rent
X	Suppressed data

Data Source: Second Count Housing Tape, U.S. Census 1970.
Reference: U.S. Bureau of the Census, 1970 Census Users Guide Part II, Department of Commerce, October 1970.

need are units lacking one or more plumbing facilities and/or those units considered overcrowded (1.01 or more persons per room). There is no assessment or overpaying for renters in this approach. The data base is the 1970 Census, Second Count Summary Tape, tabulations 65 and 66. Information regarding standard and substandard vacant units can also be provided by extracting data from the same summary tape, tabulations 52 and 53.

In contrast to the First Estimate, it is important to note that this method will only provide estimates of "households needing housing." There will not be any "rearranging" of households into standard vacant or vacated standard housing units or the provision for a percentage of standard vacant units for mobility purposes. The final estimates should in no way be interpreted as a measure of additional units needed to correct the standard housing shortage in any community.

The advantages to this particular approach are that it could be applied to all jurisdictions in the region because the data base applies universally, and hand tabulation of the data (once it is retrieved by computer) is a relatively simple process.

The applicability factor is an important one, as it allows comparisons to be made of small communities, medium-size cities, large cities, entire counties, unincorporated portions of counties, and the entire region. The First Estimate did not include small communities, and the "need" for unincorporated portions of counties was difficult to determine because of suppression problems. The Second Estimate only includes cities and places of 25,000 population or more and counties as a whole. Determining "need" for unincorporated portions of counties would not be possible with the Second Estimate, alone.

A further advantage is that it is conceivable that a comparison can be made between the Second Estimate and this method to make a very crude distribution of Second Estimate housing need to small- and medium-size cities in the region. Keeping in mind the differences in need criteria between the two methodologies, there might be a correlation between the proportions of need existing within each city. The estimates for cities of 25,000+ population and the counties would have to be compared for both methodologies to make this determination.

The disadvantages to this approach are the fact that the estimates can only be made on a one-dimensional matrix basis and the analysis can only proceed as far as estimating the number of "households needing housing." This level of detail may not be adequate to support efforts in developing an effective

regional housing element because there is no indication of the sizes or rents needed.

Method II: Small Communities Approach plus Overpaying for Renter Households. Method II is simply an extension of Method I. The housing need estimate is determined in the same manner. "Overpaying" for renters is estimated with data from the Fourth Count (Housing) Summary Tape (Tabulation 128) and can be included as a separate part of the final output. The overpaying data would be presented on a vector basis for renters by gross rent.

The advantages to this approach are the additional information provided and, again, the ability to hand tabulate the data with relative ease.

The disadvantages to this approach are that the data base excludes the small communities so that comparisons with other methods cannot be easily made, and while overpaying is measured on the basis of gross rent, the "households needing housing" vector is formed on the basis of contract rent. Despite such disadvantages, it would probably be well worth the effort to estimate the number of overpaying renter households.

Method III: Use of First Housing Need Estimate Output. This approach would use the First Estimate as the data base for a method quite similar to those just described. Housing need estimates would be carried out on a one-dimensional matrix basis only. In this case, there are two options as to the kind of matrix to be used: (1) owner/renter by bedrooms; or (2) owner/renter by value/gross rent. The criteria for determining housing need are: (1) units lacking one or more plumbing facilities; (2) units with substandard or no heating facilities; and (3) units overcrowded (1.01 or more persons per room). As with the other approaches, this method will only make estimates of "households needing housing."

The main part of the data base comes from a special version of the First Estimate. That version estimated housing need without "overpaying" for renters as a factor, making comparison between renters and owners possible. The "overpaying" data of the normal version can be included as a separate output of the method.

The time involved in the calculations should be limited, as the First Estimate printouts contain most of the needed information and hand tabulation should be a simple task. There will be no need to access any data by computer. The results of these calculations could also be compared to the results of the Second Estimate to determine any correlation between the two.

The disadvantages of this approach should be carefully considered, as they have broad implications for the validity of the estimates. A minor problem is that the approach cannot be applied to the small communities. The most important consideration is the fact that validity of the estimates is dependent on the assumption that the table (in the First Estimate) entitled "Households Needing Housing" is correct. Without cross-tabulation between the housing condition and overcrowding factors, the accuracy of the overlap between the two is open to question. The size of that overlap determines the actual number of "households needing housing."

PART III.

STRENGTHENING ABAG'S TECHNICAL CAPACITY IN HOUSING

A. APPLICATION OF THE SECOND ESTIMATE

The purpose of this section of the report is to identify the role to be played by the Second Estimate in ABAG's continuing efforts to develop and implement regional housing policies. The Second Estimate is a technical product that supports the analysis of Bay Area housing problems and provides input for policymakers and staff in advocating solutions to those problems.

Regional Housing Element - Phase I. ABAG's Executive Board recently approved the Regional Housing Element - Phase I (RHE-I).* That document contains a summary of the region's housing problems and issues; goals, objectives and policies toward resolving those problems and issues; and an outline for implementation of those goals, objectives and policies. The need for and purposes to which an assessment of Bay Area housing need will be used are clearly identified within the approved element.

The Second Estimate will obviously form a major part of the basis on which housing problems in the region will be assessed. It will provide information such as the number of substandard and overcrowded housing units by unit size and value or gross rent for cities and places of 25,000 or more population, for counties and for the Bay Area as a whole in 1970. Policymakers will be able to see where the most severe housing need existed and determine appropriate actions that should be taken at the regional level to fill those needs. As better or updated information becomes available, it will be incorporated into ABAG's continuing analysis of Bay Area housing trends.

Three implementation functions have been identified in RHE-I. They suggest where the Second Estimate will be a useful tool in the implementation of approved housing policies and objectives:

> First, as the designated regional clearinghouse, ABAG reviews all local plans and projects that propose the use of Federal funds. The policies

*Regional Housing Element - Phase I, Association of Bay Area Governments. Approved August 21, 1975.

> listed under the clearinghouse function would serve as guidelines in review of all such plans and grant applications.
>
> Second, as a voluntary association of city and county governments throughout the nine-county Bay Area, ABAG provides services to its member governments. With the adoption of these policies, ABAG would assist local governments, on request, in developing implementation measures at the local level.
>
> Third, as an advocate for regional concerns at the State and Federal levels of government, as well as in the private arena, ABAG would work to have the region's housing goals and objectives implemented through such means as new legislation, revised administrative procedures, changes in investment policies, etc.*

Under ABAG's "Plan and Project Review Function" (the first implementation function), a revised housing allocation system will be developed for review and approval. The Second Estimate will be an important element of the allocation system (see "Housing Opportunity Model" below). "Community Development Block Grant Applications must be consistent with the housing policies and housing allocation system approved by ABAG in order to receive favorable review by ABAG" (Policy 1.12).** In the event that a revised housing allocation system is not approved by the time applications for 1976 grants are submitted for A-95 review, it is conceivable that the Second Estimate figures may become the direct or indirect basis for evaluation of CD applications and Housing Assistance Plans.

Local physical development plans and proposals, growth control measures and State-mandated general plan elements must also be consistent with and indicate methods of complying with the approved allocation system to receive favorable review from ABAG (see RHE-I, Policy 1.13). In this light, the Second Estimate will probably play a smaller role than it does with Block Grant review.

The review implications under the recently enacted State law establishing a State Housing Finance Agency in California are presently unclear. Regulations and guidelines affecting the allocation of State funds and credit for the development of housing for low- and moderate-income families have not yet been established. It is assumed that the Second Estimate will be referred to in reviewing any kind of proposal under State housing programs.

In terms of providing service to member governments (the second implementation function), the Second Estimate should prove to be

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*Ibid., page 20.

**Ibid., page 22.

a very useful tool for planning departments of Bay Area counties and larger cities. The data resulting from this study is more detailed in terms of cross-tabulation than any other census reports currently available. Further, the basic data is in such a format that it can be adapted for use in other types of housing analyses.

As an advocate of regional concerns (the third implementation function), ABAG could propose that the State or Federal governments adopt the Second Estimate as the basis for assessing housing need for the region. Such recognition by funding agencies can significantly influence the total amount of non-local funding resources for housing-related activities coming into the Bay Area.

Housing Opportunity Model. Housing Objective 1 of RHE-I states: "TO HAVE A REGIONAL HOUSING ALLOCATION SYSTEM ADOPTED BY ABAG AND BY MEMBER COUNTIES AND CITIES, AS A BASIS FOR ALLOCATING THE REGION'S HOUSING SUBSIDIES."* The Second Estimate will be a significant input to the development of the allocation system.

In response to requests from the San Francisco Area Office of the Federal Department of Housing and Urban Development, ABAG developed a regional housing allocation system for review and comment in early 1974.** Since that time, many responses have been received regarding the construction and implementation of such a system. A revised system is currently under development and is scheduled to be distributed for regionwide review by the end of 1975.

The originally proposed system used six factors in a relatively simple mathematical formula. A locality's percentage of the Region's total housing need (according to the First Estimate) was an important factor in the formula, and represented one-third of final percentage assigned. Although a new formula has not been developed, it is anticipated in the development of the allocation model that the Second Estimate data will be regarded as a factor of similar importance.

Regional Housing Element - Phase II. Chapter 3 of the RHE-I described the work that must be carried out by ABAG staff in the coming years (Regional Housing Element - Phase II) to further ABAG's contribution to the attainment of regional housing goals and objectives. In essence, RHE-II will develop proposals to "put on the ground" those concepts created and approved in RHE-I. Included among Phase II's first priorities

*Ibid., page 21.

**A Housing Allocation System for the San Francisco Bay Region--Working Draft, for Discussion Only. ABAG, March 28, 1974.

is use of the Second Estimate as a major input to the revised allocation system and future housing studies, such as updated and forecast housing need estimates, or a regional housing market analysis.

B. APPLICATION OF THE SIXTH COUNT HOUSING TAPE

A separate aspect of this project was the purchase and preparation for use of the Sixth Count Housing Tape for the State of California. The Sixth Count Tape will provide housing information for cities of 50,000 or more 1970 population, central cities of SMSA's, counties, SMSA's, and the State. It contains extensive cross-tabulations of data that will be useful for detailed housing studies; ". . . including many 'three-way' cross-tabulations such as household composition, by age of head, by year structure built and by value of property."*

The Sixth Count data has been combined with data from the Second and Fourth Count population and housing tapes on a single retrieval computer program developed at the Lawrence Berkeley Laboratory. That should greatly enhance ABAG's technical capacity because it will no longer be necessary to write separate programs to retrieve data from any given tape.

A Census publication entitled Metropolitan Housing Characteristics HC(2) presents some of the data from the Sixth Count Tape. Acquisition of the tape by ABAG will make it possible for all large jurisdictions in the Bay Area to make better use of all the Sixth Count data. It will also be possible for jurisdictions in other parts of the State to gain access through application of retrieval programs.

There has already been a specific application of Sixth Count data in an analytical housing study. As mentioned earlier in this report, the Second Estimate methodology was unable to determine the number of overcrowded units in units of six or more rooms, occupied by households of six or more persons. Tabulations from the Sixth Count were used as a contributing data base in the solution to that problem.

Details regarding the acquisition of Sixth Count housing data by Bay Area jurisdictions through ABAG are being developed and will be made available to interested parties.

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APPENDIX 1

Special Census Tabulation (Sample)

Appendix 1 is a sample of the tables that make up the special census tabulation prepared by and purchased from the Bureau of the Census. The sample is for Alameda County, but the format is the same for all jurisdictions included. Totals for the nine-county Bay Area were not a part of the special tabulation. That information was derived by aggregating corresponding data from the nine-county totals.

Table I	Count of Owner-Occupied Housing Units by Value, by Number of Rooms, by Plumbing Facilities, by Heating Equipment and by Household Size.
Table II	Count of Renter-Occupied Housing Units by Monthly Gross Rent, by Number of Rooms, by Plumbing Facilities, by Heating Equipment, by Household Size and by Gross Rent as a Percentage of Income.
Table III	Count of Vacant-for-Sale Units by Value, by Number of Rooms, by Plumbing Facilities and by Heating Equipment.
Table IV	Count of Vacant-for-Rent Units by Monthly Contract Rent, by Number of Rooms, by Plumbing Facilities and by Heating Equipment.
Table V	Count of Owner-Occupied Housing Units by Value, by Number of Rooms and by Number of Bedrooms.
Table VI	Count of Renter-Occupied Housing Units by Monthly Rent, by Number of Rooms and by Number of Bedrooms.

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TABLE I. COUNT OF OWNER-OCCUPIED HOUSING UNITS BY VALUE, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, BY HEATING EQUIPMENT, AND BY HOUSEHOLD SIZE

NUMBER OF ROOMS, HEATING, AND PLUMBING	VALUE AND HOUSEHOLD SIZE: TOTAL, ALL VALUES						$19,999 AND LESS					
	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS
1 ROOM	0	70	23	21	0	0	0	59	23	0	0	0
WITH PLUMBING	0	70	0	21	0	0	0	59	0	0	0	0
WITH SUBSTANDARD HEATING	32	68	0	0	0	0	0	41	0	0	0	0
WITH ADEQUATE HEATING	339	68	0	42	0	0	0	18	0	0	0	0
LACKING 1+ FACILITIES	0	0	23	0	0	0	0	0	23	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	23	0	0	0	0	0	23	0	0	0
2 ROOMS	216	30	78	78	38	98	144	19	78	19	38	82
WITH PLUMBING	200	30	78	78	38	98	128	19	78	19	38	82
WITH SUBSTANDARD HEATING	0	21	0	0	0	20	0	0	0	0	0	20
WITH ADEQUATE HEATING	570	210	100	98	58	100	128	19	78	19	38	62
LACKING 1+ FACILITIES	16	0	0	0	0	0	16	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	34	10	0	0	0	0	16	0	0	0	0	0
3 ROOMS	865	973	298	203	79	133	417	720	219	87	21	69
WITH PLUMBING	726	909	298	203	79	133	361	677	219	87	21	69
WITH SUBSTANDARD HEATING	175	18	24	0	21	38	102	0	0	0	21	23
WITH ADEQUATE HEATING	1728	2027	393	264	79	118	440	677	219	87	0	46
LACKING 1+ FACILITIES	56	64	0	0	0	0	40	43	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	76	84	0	0	0	0	40	43	0	0	0	0
4 ROOMS	3853	3853	2130	1211	410	666	2892	3863	1377	765	235	522
WITH PLUMBING	3853	3813	2130	1211	380	666	2892	3822	1377	765	235	522
WITH SUBSTANDARD HEATING	263	183	124	0	40	49	110	100	57	0	20	29
WITH ADEQUATE HEATING	4899	9878	2640	1464	474	636	2893	3722	1320	765	215	493
LACKING 1+ FACILITIES	0	41	0	0	21	0	0	41	0	0	0	0
WITH SUBSTANDARD HEATING	18	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	18	42	0	0	21	0	0	41	0	0	0	0
5 ROOMS	7484	19930	10852	9443	5301	3669	4182	8402	4196	2834	2111	1635
WITH PLUMBING	7384	19891	10852	9378	5270	3647	4183	8382	4196	2811	2111	1635
WITH SUBSTANDARD HEATING	233	505	232	132	183	66	193	213	179	37	67	23
WITH ADEQUATE HEATING	7073	21480	11342	9648	5373	3813	3930	8189	4017	2774	2044	1612
LACKING 1+ FACILITIES	40	39	0	68	22	22	18	20	0	23	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	20	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	40	39	32	65	22	41	18	20	0	23	0	0
6+ ROOMS	6401	23404	18618	22254	14321	14292	1854	3296	1993	2484	1373	2226
WITH PLUMBING	6440	23411	18618	22216	14321	14292	1854	3296	1993	2465	1373	2226
WITH SUBSTANDARD HEATING	311	404	234	284	186	349	100	180	97	83	37	163
WITH ADEQUATE HEATING	6503	24168	18904	22364	14602	14432	1744	3116	1896	2382	1336	2063
LACKING 1+ FACILITIES	42	83	0	38	0	0	20	0	0	19	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	42	103	21	38	0	0	20	0	0	19	0	0

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TABLE I. COUNT OF OWNER-OCCUPIED HOUSING UNITS BY VALUE, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, BY HEATING EQUIPMENT, AND BY HOUSEHOLD SIZE-CONTINUED

NUMBER OF ROOMS, HEATING, AND PLUMBING	VALUE AND HOUSEHOLD SIZE: $20,000 - $34,999						$35,000 OR MORE					
	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS
1 ROOM	0	20	0	21	0	0	0	0	0	0	0	0
WITH PLUMBING	0	20	0	21	0	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	20	0	21	0	0	0	0	0	0	0	0
LACKING 1+ FACILITIES	0	0	0	0	0	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0	0	0	0	0	0
2 ROOMS	72	20	0	56	0	16	0	0	0	0	0	0
WITH PLUMBING	72	20	0	56	0	16	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	72	20	0	56	0	16	0	0	0	0	0	0
LACKING 1+ FACILITIES	0	0	0	0	0	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0	0	0	0	0	0
3 ROOMS	194	213	56	116	58	64	0	40	21	0	0	0
WITH PLUMBING	194	198	56	116	58	64	0	40	21	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	15	0	0	0	0	0	0
WITH ADEQUATE HEATING	194	198	56	116	58	49	0	40	21	0	0	0
LACKING 1+ FACILITIES	0	21	0	0	0	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	21	0	0	0	0	0	0	0	0	0	0
4 ROOMS	853	1790	637	410	154	144	88	200	116	36	21	0
WITH PLUMBING	853	1790	637	410	154	144	88	200	116	36	0	0
WITH SUBSTANDARD HEATING	46	18	0	0	0	20	0	0	0	0	0	0
WITH ADEQUATE HEATING	807	1772	637	410	154	124	88	200	116	36	0	0
LACKING 1+ FACILITIES	0	0	0	0	0	0	0	0	0	0	21	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0	0	0	0	21	0
5 ROOMS	3028	10843	6433	6368	3074	1962	544	685	223	244	116	72
WITH PLUMBING	3007	10824	6433	6345	3052	1940	544	685	223	222	116	72
WITH SUBSTANDARD HEATING	43	194	33	43	56	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	2964	10630	6400	6302	2996	1940	544	685	223	222	116	72
LACKING 1+ FACILITIES	21	19	0	23	22	22	0	0	0	22	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	21	19	0	23	22	22	0	0	0	22	0	0
6+ ROOMS	3403	14352	12347	14091	9040	9494	1472	5846	4275	4779	2999	2572
WITH PLUMBING	3471	14288	12347	14072	9040	9494	1472	5827	4275	4779	2999	2572
WITH SUBSTANDARD HEATING	151	224	80	150	93	124	42	0	18	29	18	19
WITH ADEQUATE HEATING	3320	14064	12267	14822	9854	9370	1430	5827	4257	4750	2981	2553
LACKING 1+ FACILITIES	22	64	0	19	0	0	0	19	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	22	64	0	19	0	0	0	19	0	0	0	0

TABLE II. COUNT OF RENTER-OCCUPIED HOUSING UNITS BY MONTHLY GROSS RENT, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, BY HEATING EQUIPMENT, BY HOUSEHOLD SIZE, AND BY GROSS RENT AS A PERCENTAGE OF INCOME

ROOMS, HEATING, PLUMBING, AND GROSS RENT AS % OF INCOME	RENT AND HOUSEHOLD SIZE — TOTAL, ALL RENTS						RENT AND HOUSEHOLD SIZE — $99 AND LESS					
	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS
1 ROOM	7366	610	138	80	48	28	7316	577	98	43	0	28
WITH PLUMBING	3926	466	118	38	28	28	3867	433	80	19	0	28
WITH SUBSTANDARD HEATING	419	28	28	0	0	28	419	21	28	0	0	28
RENT <24 PERCENT	140	28	28	0	0	28	140	0	28	0	0	28
RENT 25-34 PERCENT	140	0	0	0	0	0	140	0	0	0	0	0
RENT 35 PERCENT OR MORE	140	0	0	0	0	0	140	21	0	0	0	0
WITH ADEQUATE HEATING	3507	438	106	38	28	0	3448	412	52	19	0	0
RENT <24 PERCENT	1898	238	0	19	0	0	1838	82	0	19	0	0
RENT 25-34 PERCENT	443	68	48	0	0	0	368	0	0	0	0	0
RENT 35 PERCENT OR MORE	1878	188	43	19	28	0	1703	43	28	0	0	0
LACKING 1+ FACILITIES	3439	144	20	24	20	0	3389	131	18	24	0	0
WITH SUBSTANDARD HEATING	415	28	0	0	0	0	415	28	0	0	0	0
RENT <24 PERCENT	148	28	0	0	0	0	148	28	0	0	0	0
RENT 25-34 PERCENT	70	0	0	0	0	0	70	0	0	0	0	0
RENT 35 PERCENT OR MORE	197	0	0	0	0	0	197	0	0	0	0	0
WITH ADEQUATE HEATING	3024	116	20	24	20	0	2974	103	18	24	0	0
RENT <24 PERCENT	1382	90	0	0	0	0	1382	67	0	0	0	0
RENT 25-34 PERCENT	477	0	0	24	20	0	477	0	0	24	0	0
RENT 35 PERCENT OR MORE	1066	30	28	0	0	0	1015	30	28	0	0	0
2 ROOMS	13486	4083	839	364	109	89	11776	3210	335	123	24	48
WITH PLUMBING	12880	3874	810	324	100	68	11348	3080	316	105	24	48
WITH SUBSTANDARD HEATING	1208	328	187	84	20	24	1040	188	101	18	0	24
RENT <24 PERCENT	389	180	100	41	20	24	270	104	54	18	0	24
RENT 25-34 PERCENT	136	0	47	0	0	0	130	0	47	0	0	0
RENT 35 PERCENT OR MORE	686	148	0	16	0	0	613	44	0	0	0	0
WITH ADEQUATE HEATING	11749	3613	608	309	80	41	10308	914	215	87	24	21
RENT <24 PERCENT	4687	1708	340	139	44	41	3879	539	179	18	24	21
RENT 25-34 PERCENT	1726	488	108	120	0	0	1647	100	0	49	0	0
RENT 35 PERCENT OR MORE	4819	1531	148	20	29	0	3407	215	36	20	0	0
LACKING 1+ FACILITIES	791	169	19	18	0	24	766	130	19	18	0	0
WITH SUBSTANDARD HEATING	284	42	19	0	0	24	284	23	19	0	0	0
RENT <24 PERCENT	178	0	19	0	0	24	178	0	19	0	0	0
RENT 25-34 PERCENT	46	42	0	0	0	0	46	23	0	0	0	0
RENT 35 PERCENT OR MORE	60	0	0	0	0	0	60	0	0	0	0	0
WITH ADEQUATE HEATING	507	169	0	18	0	0	482	107	0	18	0	0
RENT <24 PERCENT	199	64	0	0	0	0	199	64	0	0	0	0
RENT 25-34 PERCENT	185	42	0	0	0	0	135	43	0	0	0	0
RENT 35 PERCENT OR MORE	109	20	0	18	0	0	109	0	0	18	0	0

TABLE II. COUNT OF RENTER-OCCUPIED HOUSING UNITS BY MONTHLY GROSS RENT, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, BY HEATING EQUIPMENT, BY HOUSEHOLD SIZE, AND BY GROSS RENT AS A PERCENTAGE OF INCOME—CONTINUED

ROOMS, HEATING, PLUMBING, AND GROSS RENT AS % OF INCOME	RENT AND HOUSEHOLD SIZE — TOTAL, ALL RENTS						RENT AND HOUSEHOLD SIZE — $99 AND LESS					
	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS
3 ROOMS	28908	18934	4286	1180	334	399	8443	4361	1115	455	139	208
WITH PLUMBING	24239	18373	4268	1089	334	381	8362	4217	1094	404	139	190
WITH SUBSTANDARD HEATING	1616	1500	583	64	30	137	988	719	124	23	30	22
RENT <24 PERCENT	833	730	240	30	21	88	500	372	99	23	21	22
RENT 25-34 PERCENT	134	231	64	25	0	33	70	93	0	0	0	0
RENT 35 PERCENT OR MORE	800	407	244	0	18	0	418	235	25	0	18	0
WITH ADEQUATE HEATING	22800	17238	3745	1025	298	283	7447	3498	970	381	100	168
RENT <24 PERCENT	9401	9038	1824	605	178	221	2795	1874	649	253	41	148
RENT 25-34 PERCENT	3433	2681	761	187	10	20	914	721	167	25	19	20
RENT 35 PERCENT OR MORE	9134	4663	1017	308	98	19	3448	797	133	103	40	0
LACKING 1+ FACILITIES	1885	163	21	81	0	18	101	144	21	51	0	18
WITH SUBSTANDARD HEATING	19	44	0	19	0	0	19	44	0	19	0	0
RENT <24 PERCENT	5	44	0	19	0	0	0	44	0	19	0	0
RENT 25-34 PERCENT	6	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	19	0	0	0	0	0	19	0	0	0	0	0
WITH ADEQUATE HEATING	1866	119	21	32	0	18	82	100	21	32	0	18
RENT <24 PERCENT	46	60	0	32	0	18	21	60	0	32	0	18
RENT 25-34 PERCENT	0	59	0	0	0	0	0	40	0	0	0	0
RENT 35 PERCENT OR MORE	1820	0	21	0	0	0	61	0	21	0	0	0
4 ROOMS	16131	19397	11681	7188	2104	1698	2484	2284	1524	1133	439	322
WITH PLUMBING	9904	19216	11601	7188	2104	1671	2398	2244	1472	1133	439	322
WITH SUBSTANDARD HEATING	663	886	748	479	274	198	198	177	198	205	137	92
RENT <24 PERCENT	261	360	434	314	194	177	82	91	179	116	91	92
RENT 25-34 PERCENT	197	133	83	82	31	0	34	41	0	36	0	0
RENT 35 PERCENT OR MORE	225	328	184	193	58	21	82	45	19	38	35	0
WITH ADEQUATE HEATING	9408	18465	11068	6603	1868	1511	2220	2067	1274	928	295	230
RENT <24 PERCENT	3383	10138	6434	3886	1174	811	840	1209	730	613	173	126
RENT 25-34 PERCENT	1622	3441	1631	885	184	328	373	301	135	118	17	0
RENT 35 PERCENT OR MORE	3970	4886	2868	1816	417	288	1158	557	384	128	74	55
LACKING 1+ FACILITIES	139	127	80	0	0	24	76	40	52	0	0	0
WITH SUBSTANDARD HEATING	46	21	0	0	0	0	26	21	0	0	0	0
RENT <24 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	26	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	26	21	0	0	0	0	26	21	0	0	0	0
WITH ADEQUATE HEATING	91	106	80	0	0	24	50	19	52	0	0	0
RENT <24 PERCENT	0	63	28	0	0	24	0	0	25	0	0	0
RENT 25-34 PERCENT	26	24	28	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	91	19	27	0	0	0	50	19	27	0	0	0

TABLE II. COUNT OF RENTER-OCCUPIED HOUSING UNITS BY MONTHLY GROSS RENT, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, BY HEATING EQUIPMENT, BY HOUSEHOLD SIZE, AND BY GROSS RENT AS A PERCENTAGE OF INCOME—CONTINUED

ROOMS, HEATING, PLUMBING, AND GROSS RENT AS % OF INCOME	RENT AND HOUSEHOLD SIZE: TOTAL, ALL RENTS						$99 AND LESS					
	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS
5 ROOMS	3738	7015	5834	5688	3646	2088	606	768	469	702	660	588
WITH PLUMBING	3503	6858	5808	5619	3640	2031	606	768	469	702	660	588
WITH SUBSTANDARD HEATING	251	308	198	285	238	233	61	123	19	83	82	69
RENT <24 PERCENT	109	201	109	198	88	86	61	123	0	43	22	69
RENT 25-34 PERCENT	33	30	40	11	88	46	0	0	0	0	33	0
RENT 35 PERCENT OR MORE	109	42	129	0	90	78	0	0	19	0	27	0
WITH ADEQUATE HEATING	3199	7030	5476	5140	3648	2713	606	645	450	619	578	490
RENT <24 PERCENT	873	2310	3100	3000	2000	1023	311	483	330	487	256	333
RENT 25-34 PERCENT	488	1009	718	703	880	490	106	108	88	130	124	98
RENT 35 PERCENT OR MORE	1361	1181	1129	940	760	508	144	84	53	76	144	98
LACKING 1+ FACILITIES	44	93	28	30	0	23	0	0	0	0	0	23
WITH SUBSTANDARD HEATING	0	28	0	0	0	0	0	0	0	0	0	0
RENT <24 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	28	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	44	41	28	30	0	23	0	0	0	0	0	23
RENT <24 PERCENT	0	19	0	0	0	23	0	0	0	0	0	23
RENT 25-34 PERCENT	21	0	28	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	24	22	0	30	0	0	0	0	0	0	0	0
6+ ROOMS	867	2318	2548	2752	2436	3280	139	81	123	241	105	330
WITH PLUMBING	848	2318	2826	2706	2436	3280	134	81	123	241	105	330
WITH SUBSTANDARD HEATING	42	96	158	186	122	288	0	0	0	27	21	21
RENT <24 PERCENT	19	19	18	98	88	136	0	0	0	27	21	21
RENT 25-34 PERCENT	0	0	40	20	88	80	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	23	23	91	49	23	69	0	0	0	0	0	0
WITH ADEQUATE HEATING	839	2504	2637	2719	2484	3400	134	81	123	214	84	309
RENT <24 PERCENT	226	1328	1254	1336	1307	1928	78	81	123	170	64	250
RENT 25-34 PERCENT	173	358	428	426	388	568	56	0	0	24	16	39
RENT 35 PERCENT OR MORE	440	548	686	690	634	514	61	0	0	20	0	0
LACKING 1+ FACILITIES	19	0	19	44	0	0	5	0	0	0	0	0
WITH SUBSTANDARD HEATING	19	0	19	0	0	0	5	0	0	0	0	0
RENT <24 PERCENT	19	0	0	0	0	0	5	0	0	0	0	0
RENT 25-34 PERCENT	0	0	19	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	44	0	0	0	0	0	0	0	0
RENT <24 PERCENT	0	0	0	20	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	0	0	24	0	0	0	0	0	0	0	0

TABLE II. COUNT OF RENTER-OCCUPIED HOUSING UNITS BY MONTHLY GROSS RENT, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, BY HEATING EQUIPMENT, BY HOUSEHOLD SIZE, AND BY GROSS RENT AS A PERCENTAGE OF INCOME—CONTINUED

ROOMS, HEATING, PLUMBING, AND GROSS RENT AS % OF INCOME	RENT AND HOUSEHOLD SIZE: $100 - $199						$200 OR MORE					
	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS
1 ROOM	1313	341	60	16	28	0	356	0	0	0	20	0
WITH PLUMBING	1183	318	60	16	28	0	282	0	0	0	0	0
WITH SUBSTANDARD HEATING	23	45	0	0	0	0	0	0	0	0	0	0
RENT <24 PERCENT	0	23	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	22	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	23	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	1161	273	60	16	28	0	282	0	0	0	0	0
RENT <24 PERCENT	338	148	0	0	0	0	22	0	0	0	0	0
RENT 25-34 PERCENT	87	65	42	0	0	0	16	0	0	0	0	0
RENT 35 PERCENT OR MORE	713	60	18	16	28	0	184	0	0	0	0	0
LACKING 1+ FACILITIES	130	23	0	0	0	0	134	0	0	0	20	0
WITH SUBSTANDARD HEATING	5	0	0	0	0	0	0	0	0	0	0	0
RENT <24 PERCENT	5	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	130	23	0	0	0	0	134	0	0	0	20	0
RENT <24 PERCENT	67	23	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	0	0	20	0
RENT 35 PERCENT OR MORE	63	0	0	0	0	0	88	0	0	0	0	0
2 ROOMS	5386	2746	494	221	85	20	150	87	0	0	0	24
WITH PLUMBING	5341	2709	494	221	85	20	150	87	0	0	0	0
WITH SUBSTANDARD HEATING	348	160	46	38	20	0	0	0	0	0	0	0
RENT <24 PERCENT	117	79	46	23	20	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	267	84	0	16	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	4994	2549	448	183	65	20	150	87	0	0	0	0
RENT <24 PERCENT	1809	1143	181	141	43	20	30	23	0	0	0	0
RENT 25-34 PERCENT	879	388	162	71	0	0	8	0	0	0	0	0
RENT 35 PERCENT OR MORE	2141	882	106	0	23	0	40	64	0	0	0	0
LACKING 1+ FACILITIES	45	39	0	0	0	0	0	0	0	0	0	24
WITH SUBSTANDARD HEATING	0	19	0	0	0	0	0	0	0	0	0	24
RENT <24 PERCENT	0	0	0	0	0	0	0	0	0	0	0	24
RENT 25-34 PERCENT	0	19	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	45	20	0	0	0	0	0	0	0	0	0	0
RENT <24 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	45	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	20	0	0	0	0	0	0	0	0	0	0

TABLE II. COUNT OF RENTER-OCCUPIED HOUSING UNITS BY MONTHLY GROSS RENT, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, BY HEATING EQUIPMENT, BY HOUSEHOLD SIZE, AND BY GROSS RENT AS A PERCENTAGE OF INCOME-CONTINUED

ROOMS, HEATING, PLUMBING, AND GROSS RENT AS % OF INCOME	RENT AND HOUSEHOLD SIZE: $100 - $199						$200 OR MORE					
	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS
3 ROOMS	18873	13668	3648	470	198	191	548	487	66	15	0	0
WITH PLUMBING	18830	13668	3648	470	198	191	548	487	66	15	0	0
WITH SUBSTANDARD HEATING	646	736	498	81	0	44	44	0	0	0	0	0
RENT <24 PERCENT	226	388	191	18	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	66	188	66	25	0	33	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	388	158	219	0	0	0	44	0	0	0	0	0
WITH ADEQUATE HEATING	18784	12932	3150	389	198	98	504	487	66	15	0	0
RENT <24 PERCENT	9886	6938	1778	288	134	73	48	286	0	0	0	0
RENT 25-34 PERCENT	2488	1817	586	108	0	0	47	103	42	0	0	0
RENT 35 PERCENT OR MORE	5409	3931	840	87	84	19	261	138	44	15	0	0
LACKING 1+ FACILITIES	84	19	0	0	0	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	0	0	0	0
RENT <24 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	84	19	0	0	0	0	0	0	0	0	0	0
RENT <24 PERCENT	28	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	19	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	56	0	0	0	0	0	0	0	0	0	0	0
4 ROOMS	21154	18801	9158	3448	1898	1331	537	1888	1002	547	80	42
WITH PLUMBING	21154	18774	9129	3448	1898	1289	537	1888	1002	547	80	42
WITH SUBSTANDARD HEATING	766	668	410	400	196	108	40	63	63	18	0	0
RENT <24 PERCENT	100	287	258	180	84	88	40	42	0	18	0	0
RENT 25-34 PERCENT	173	93	83	46	31	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	169	288	78	188	83	21	0	21	63	0	0	0
WITH ADEQUATE HEATING	20388	18106	8719	3048	1702	1181	497	1825	939	529	80	42
RENT <24 PERCENT	7488	8181	5258	2137	950	688	198	798	449	136	42	0
RENT 25-34 PERCENT	1188	2218	1408	703	187	307	187	488	84	34	0	21
RENT 35 PERCENT OR MORE	2706	3868	1858	1098	388	208	188	587	373	293	38	21
LACKING 1+ FACILITIES	41	87	28	0	0	84	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	28	0	0	0	0	0	0	0	0	0	0	0
RENT <24 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	28	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	41	87	28	0	0	84	0	0	0	0	0	0
RENT <24 PERCENT	0	63	0	0	0	84	0	0	0	0	0	0
RENT 25-34 PERCENT	20	24	28	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	21	0	0	0	0	0	0	0	0	0	0	0

TABLE II. COUNT OF RENTER-OCCUPIED HOUSING UNITS BY MONTHLY GROSS RENT, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, BY HEATING EQUIPMENT, BY HOUSEHOLD SIZE, AND BY GROSS RENT AS A PERCENTAGE OF INCOME-CONTINUED

ROOMS, HEATING, PLUMBING, AND GROSS RENT AS % OF INCOME	RENT AND HOUSEHOLD SIZE: $100 - $199						$200 OR MORE					
	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS	1 PERSON	2 PERSONS	3 PERSONS	4 PERSONS	5 PERSONS	6+ PERSONS
5 ROOMS	3584	4738	4190	3889	2368	1875	878	1513	871	1048	612	397
WITH PLUMBING	3581	4694	4168	3889	2368	1875	878	1491	871	1028	612	397
WITH SUBSTANDARD HEATING	116	158	296	114	118	138	0	21	47	23	41	0
RENT <24 PERCENT	44	78	168	93	46	20	0	0	21	23	0	0
RENT 25-34 PERCENT	0	38	20	21	32	40	0	21	26	0	0	0
RENT 35 PERCENT OR MORE	44	43	108	0	26	78	0	0	0	0	41	0
WITH ADEQUATE HEATING	1871	4536	3860	3775	2254	1737	878	1470	824	1005	571	397
RENT <24 PERCENT	494	2950	2453	2241	1488	1038	186	907	403	318	327	172
RENT 25-34 PERCENT	446	718	538	338	267	335	183	273	125	325	68	52
RENT 35 PERCENT OR MORE	934	798	800	881	414	297	231	272	296	322	176	160
LACKING 1+ FACILITIES	45	41	28	0	0	0	0	22	0	20	0	0
WITH SUBSTANDARD HEATING	0	28	0	0	0	0	0	0	0	0	0	0
RENT <24 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	28	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	45	13	28	0	0	0	0	22	0	20	0	0
RENT <24 PERCENT	0	13	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	21	0	28	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	24	0	0	0	0	0	0	22	0	20	0	0
6+ ROOMS	493	1568	1520	991	1148	1078	258	669	902	1520	1186	1072
WITH PLUMBING	493	1568	1520	971	1148	1078	258	669	883	1496	1186	1072
WITH SUBSTANDARD HEATING	42	19	88	60	118	137	0	23	73	97	0	94
RENT <24 PERCENT	19	19	18	34	41	97	0	0	0	14	0	18
RENT 25-34 PERCENT	0	0	49	0	58	20	0	0	0	20	0	30
RENT 35 PERCENT OR MORE	23	0	18	26	23	20	0	23	73	23	0	46
WITH ADEQUATE HEATING	451	1548	1438	911	1029	1741	238	646	810	1439	1186	978
RENT <24 PERCENT	188	843	786	490	666	1240	30	404	345	666	573	439
RENT 25-34 PERCENT	22	288	213	142	138	279	66	73	215	290	207	247
RENT 35 PERCENT OR MORE	225	376	436	196	288	222	138	169	250	474	406	292
LACKING 1+ FACILITIES	0	0	0	20	0	0	0	0	19	24	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0	0	19	0	0	0
RENT <24 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	19	0	0	0
RENT 35 PERCENT OR MORE	0	0	0	0	0	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	20	0	0	0	0	0	24	0	0
RENT <24 PERCENT	0	0	0	20	0	0	0	0	0	0	0	0
RENT 25-34 PERCENT	0	0	0	0	0	0	0	0	0	0	0	0
RENT 35 PERCENT OR MORE	0	0	0	0	0	0	0	0	0	24	0	0

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TABLE 33. COUNT OF VACANT-FOR-SALE UNITS BY VALUE, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, AND BY HEATING EQUIPMENT

VALUE, ROOMS, AND PLUMBING	NUMBER OF ROOMS						
	TOTAL	1 ROOM	2 ROOMS	3 ROOMS	4 ROOMS	5 ROOMS	6+ ROOMS
LESS THAN $20,000	2084	0	0	23	273	633	1155
WITH PLUMBING	2072	0	0	23	261	633	1155
WITH SUBSTANDARD HEATING	49	0	0	0	0	24	25
WITH ADEQUATE HEATING	2023	0	0	23	261	609	1130
LACKING 1+ FACILITIES	12	0	0	0	12	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	12	0	0	0	12	0	0
$20,000 - $34,999	0	0	0	0	0	0	0
WITH PLUMBING	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0
LACKING 1+ FACILITIES	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0
$35,000 OR MORE	0	0	0	0	0	0	0
WITH PLUMBING	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0
LACKING 1+ FACILITIES	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0

TABLE IV. COUNT OF VACANT-FOR-RENT UNITS BY MONTHLY GROSS RENT, BY NUMBER OF ROOMS, BY PLUMBING FACILITIES, AND BY HEATING EQUIPMENT

GROSS RENT, HEATING, AND PLUMBING	NUMBER OF ROOMS						
	TOTAL	1 ROOM	2 ROOMS	3 ROOMS	4 ROOMS	5 ROOMS	6+ ROOMS
LESS THAN $100	8879	764	1154	2484	2723	1238	516
WITH PLUMBING	8130	191	1026	2463	2656	1238	516
WITH SUBSTANDARD HEATING	490	13	95	167	131	64	40
WITH ADEQUATE HEATING	7640	178	931	2316	2565	1174	476
LACKING 1+ FACILITIES	749	573	128	21	27	0	0
WITH SUBSTANDARD HEATING	126	105	0	21	0	0	0
WITH ADEQUATE HEATING	623	468	128	0	27	0	0
$100 - $199	0	0	0	0	0	0	0
WITH PLUMBING	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0
LACKING 1+ FACILITIES	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0
$200 OR MORE	0	0	0	0	0	0	0
WITH PLUMBING	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0
LACKING 1+ FACILITIES	0	0	0	0	0	0	0
WITH SUBSTANDARD HEATING	0	0	0	0	0	0	0
WITH ADEQUATE HEATING	0	0	0	0	0	0	0

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TABLE V. COUNT OF OWNER-OCCUPIED HOUSING UNITS BY VALUE, BY NUMBER OF ROOMS, AND BY NUMBER OF BEDROOMS

VALUE AND NUMBER OF BEDROOMS	NUMBER OF ROOMS						
	TOTAL	1 ROOM	2 ROOMS	3 ROOMS	4 ROOMS	5 ROOMS	6+ ROOMS
LESS THAN $20,000	47761	82	380	1727	9354	23320	12898
NO BEDROOM	194	82	62	50	0	0	0
1 BEDROOM	3676	0	318	1419	1412	392	135
2 BEDROOMS	24161	0	0	258	7633	14034	2236
3 BEDROOMS	17572	0	0	0	309	8785	8478
4+ BEDROOMS	2158	0	0	0	0	109	2049
$20,000 - $34,999	101225	41	164	701	3988	31705	64626
NO BEDROOM	41	41	0	0	0	0	0
1 BEDROOM	1557	0	164	496	366	291	240
2 BEDROOMS	20061	0	0	205	3348	11652	4856
3 BEDROOMS	61212	0	0	0	274	19479	41459
4+ BEDROOMS	18354	0	0	0	0	283	18071
$35,000 OR MORE	40358	426	701	2609	5017	6094	25511
NO BEDROOM	632	426	163	43	0	0	0
1 BEDROOM	3961	0	538	2147	986	200	90
2 BEDROOMS	9875	0	0	419	3757	3728	1971
3 BEDROOMS	13685	0	0	0	234	2023	11428
4+ BEDROOMS	12205	0	0	0	0	143	12062

TABLE VI. COUNT OF RENTER-OCCUPIED HOUSING UNITS BY MONTHLY RENT, BY NUMBER OF ROOMS, AND BY NUMBER OF BEDROOMS

GROSS RENT AND NUMBER OF BEDROOMS	NUMBER OF ROOMS						
	TOTAL	1 ROOM	2 ROOMS	3 ROOMS	4 ROOMS	5 ROOMS	6+ ROOMS
LESS THAN $100	44574	6216	9923	14822	8414	4079	1120
NO BEDROOM	9657	6216	2924	517	0	0	0
1 BEDROOM	23302	0	6999	13408	2581	265	49
2 BEDROOMS	8374	0	0	897	5446	1883	148
3 BEDROOMS	2764	0	0	0	387	1860	517
4+ BEDROOMS	477	0	0	0	0	71	406
$100 - $199	109954	1755	8952	33342	39830	18483	7592
NO BEDROOM	3918	1755	1873	290	0	0	0
1 BEDROOM	44701	0	7079	29908	6832	702	180
2 BEDROOMS	48966	0	0	3144	32325	11681	1816
3 BEDROOMS	10948	0	0	0	673	6013	4262
4+ BEDROOMS	1421	0	0	0	0	87	1334
$200 OR MORE	16254	346	261	1020	4054	4959	5574
NO BEDROOM	365	346	0	19	0	0	0
1 BEDROOM	1303	0	261	604	255	122	21
2 BEDROOMS	6285	0	0	397	3573	1921	394
3 BEDROOMS	6194	0	0	0	226	2844	3124
4+ BEDROOMS	2107	0	0	0	0	72	2035

APPENDIX 2

Second Estimate Methodology Description

There are eight processes in the Second Estimate methodology. This appendix will provide a step-by-step description of each process. Figure 4 (see page A2-2) illustrates how data from the special census tabulation is combined and manipulated in the methodology. Scaled-down versions of the diagram at the top of the beginning page for each process described indicate the inputs and outputs involved. Occasional reference to the computer printouts found in Appendix 4 would be helpful in understanding the process descriptions. The following outline summarizes the processes and steps within each:

Process #1 Existing Universe Matrix

- Step 1a Initial matrix fill
- Step 1b Additional matrix fill
- Step 1c Convert matrix type

Process #2 Conversion Process

- Step 2a Initial sub-matrix fill
- Step 2b Add submatrices
- Step 2c Develop conversion tables
- 2d Apply conversion tables
- 2e Aggregate converted submatrices

Process #3 Basic Matrix Formation

- Step 3a Form submatrices
- Step 3b Separate submatrices (1)
- Step 3c Aggregate submatrices (Housing Units)
- 3d Separate submatrices (2)
- 3e Aggregate submatrices (Households)

Process #4 Overcrowding Correction Procedure

- Step 4a Obtain printouts
- Step 4b Determine total overcrowded units
- Step 4c Determine known overcrowded units
- 4d Determine unknown overcrowded units
- 4e Distribute determined overcrowded units
- 4f Subtract from not overcrowded matrices

Process #5 Combining Basic Matrices

- Step 5a Combine appropriate matrices

Process #6 Matching Subroutine

- Step 6a Match resources and inadequately housed
- Step 6b Develop "Excess Standard Vacant$_1$"
- 6c Develop "Unmatched Housing Need"
- 6d Develop "Matched Housing Need$_1$"

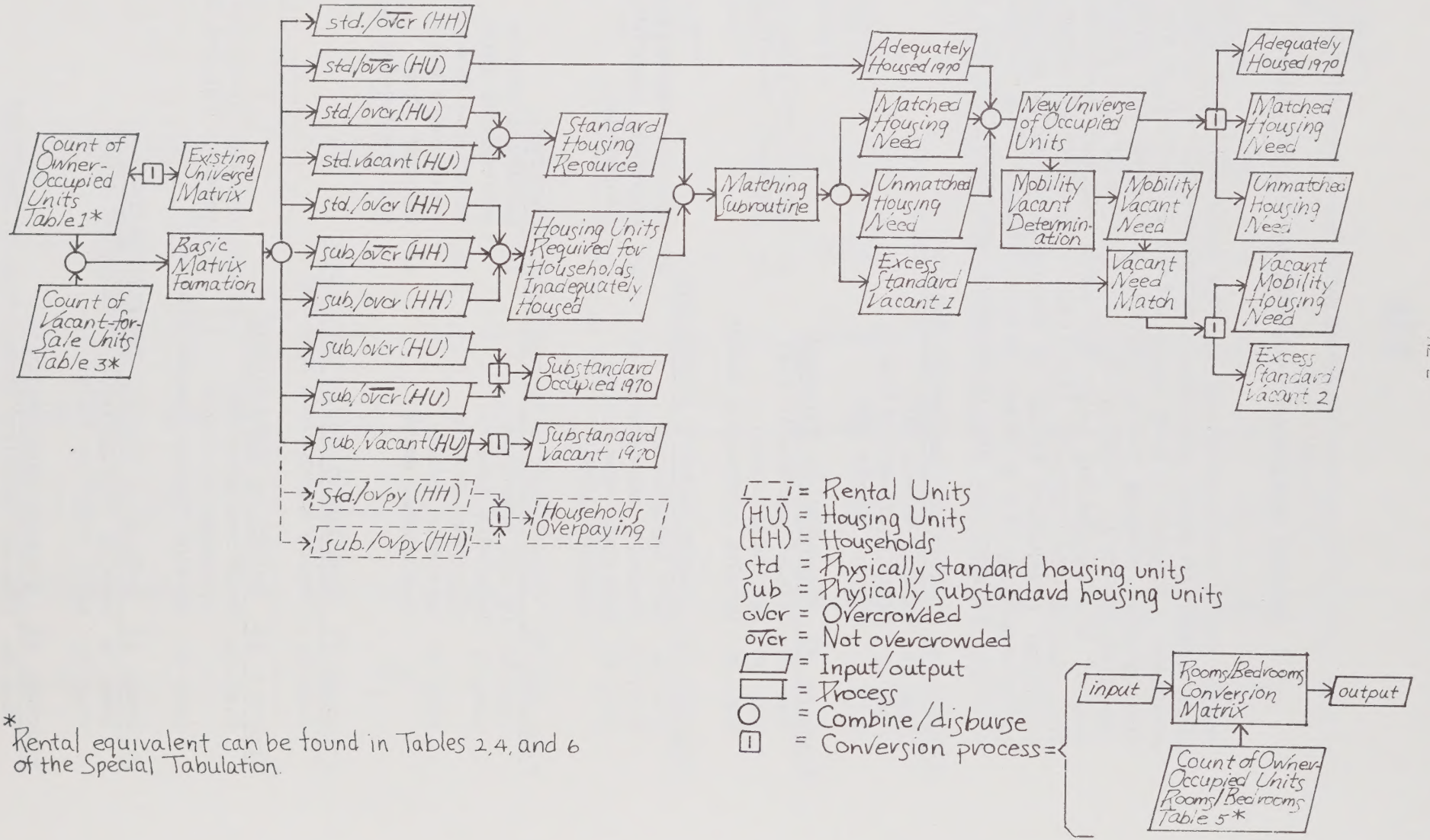
Process #7 Mobility Vacant Determination

- Step 7a Develop "New Universe of Occupied Units"
- Step 7b Apply mobility factor

Process #8 Vacant Need Match

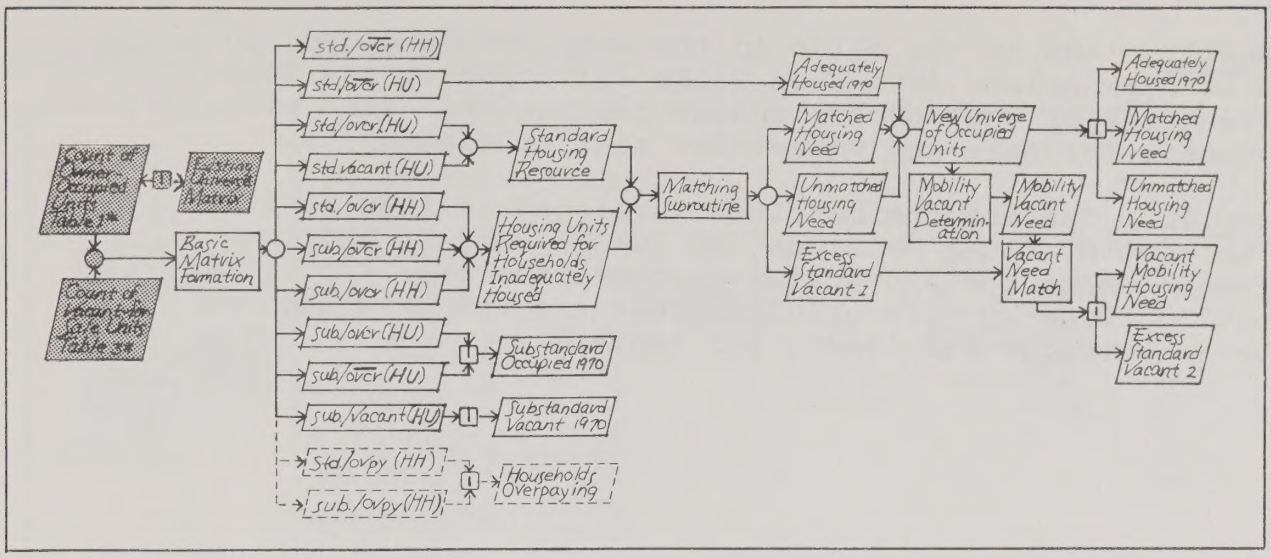
- Step 8a Develop "Mobility Vacant Housing Need" and "Excess Standard Vacant$_2$"

FIGURE 4
INFORMATION DIAGRAM--SECOND ESTIMATE OF BAY AREA HOUSING NEED, 1970



*Rental equivalent can be found in Tables 2, 4, and 6 of the Special Tabulation.

Process #1 Existing Universe Matrix



The Existing Universe Matrix is an output matrix showing a count of the total existing housing stock, value by bedrooms for owners and gross rent by bedrooms for renters. From the data supplied in the special census tabulation, use Tables I and III to form the matrix for owners and Tables II and IV to form the matrix for renters.

The formation of the Existing Universe Matrix is a three-step process:

- Step 1a. Form two matrices (one each for owners and renters) in three by six grids, as shown in Figure 5. Fill the cells in the matrix with the appropriate data from Table I (owners) and Table II (renters) of the special census tabulation. That yields a count of the occupied owner and renter housing units.

FIGURE 5: Rooms Matrices

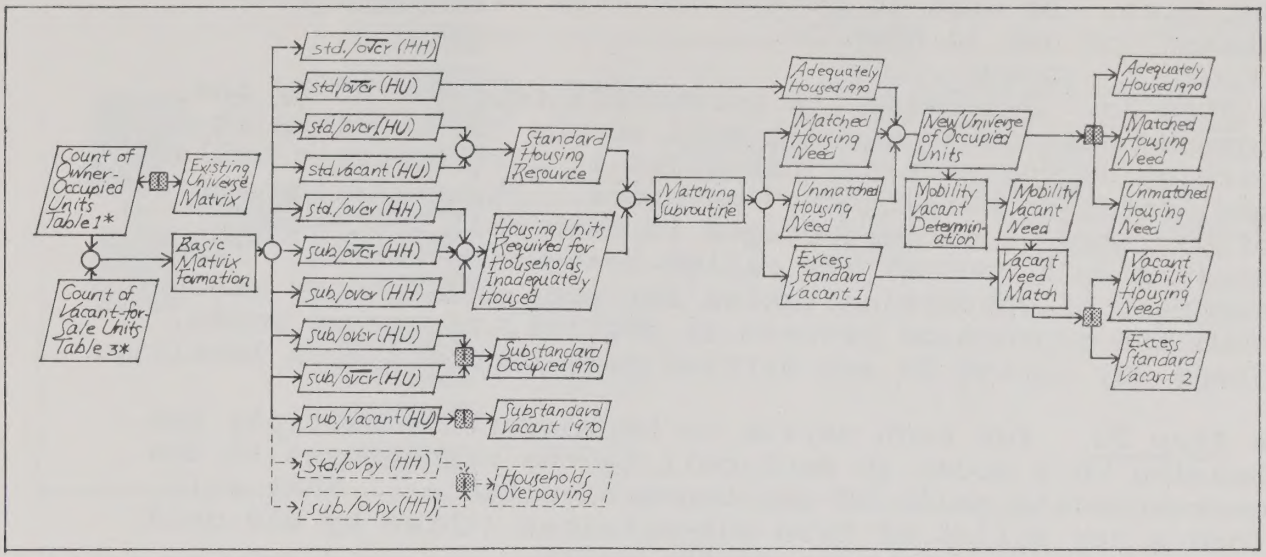
	OWNERS Rooms per Unit						
VALUE	1	2	3	4	5	6+	TOTAL
Less Than $20,000							
$20-34,999							
$35,000+							
TOTAL							

	RENTERS Rooms per Unit						
GROSS RENT	1	2	3	4	5	6+	TOTAL
Less Than $100							
$100-199							
$200+							
TOTAL							

- Step 1b. Add to the cells in the matrices developed in Step 1a appropriate data from Table III (owners) and Table IV (renters) of the special census tabulation. That will add vacant-for-sale and vacant-for rent housing units.

- Step 1c. Convert the matrices developed in Step 1b from "value/rent by rooms matrices" to "value/rent by bedrooms matrices" using the conversion process (see page A2-5). The resulting three by five grid matrices are the Existing Universe Matrices for owners and renters.

Process #2 Conversion Process



The conversion process translates three by six grid matrices (value/rent by rooms) into three by five grid matrices (value/rent by bedrooms). A number of the output matrices in the methodology are "converted" for reasons stated in another section of this report (see Rooms Matrix vs. Bedrooms Matrix). Use of the conversion process is indicated by the symbol 1 which precedes the matrix to be converted in the flow diagram.

There are six steps in the conversion process:

• Step 2a. Form two series of five sub-matrices; one series each for owners and renters. Using appropriate data from Table V (owners) or Table VI (renters) of the special census tabulation, fill the cells of each sub-matrix so that each series will present the following information:

Owner-Occupied (Table V)	Renter-Occupied (Table VI)
1) value by rooms by 0 bedroom	1) gross rent by rooms by 0 bedroom
2) value by rooms by 1 bedroom	2) gross rent by rooms by 1 bedroom
3) value by rooms by 2 bedrooms	3) gross rent by rooms by 2 bedrooms
4) value by rooms by 3 bedrooms	4) gross rent by rooms by 3 bedrooms
5) value by rooms by 4+ bedrooms	5) gross rent by rooms by 4+ bedrooms

• Step 2b. For each series developed in Step 2a, add the sub-matrices together, forming "total rooms/bedrooms" matrices. Be sure to retain the Step 2a sub-matrices intact for use in Step 2c.

• Step 2c. Determine the percentage represented by the housing unit count in each cell of the sub-matrices as a portion of the housing unit count in corresponding cells of the "total rooms/bedrooms" matrices. The resulting series of matrices (with percentages in each cell instead of housing unit counts) are called conversion tables. That same set of conversion tables for each locality is used when the conversion process ia applied. In other words, Steps 2a, 2b and 2c are carried only once for each locality.

• Step 2d. For each matrix to be converted, multiply the housing unit count in each cell by the percentages in the corresponding cells of the conversion tables. That will form a new series of five sub-matrices (three by six grid) with housing unit counts in the cells.

• Step 2e. Aggregate the housing unit counts resulting from Step 2d by value or rent (i.e., horizontally) to form five vectors for each series of new sub-matrices.

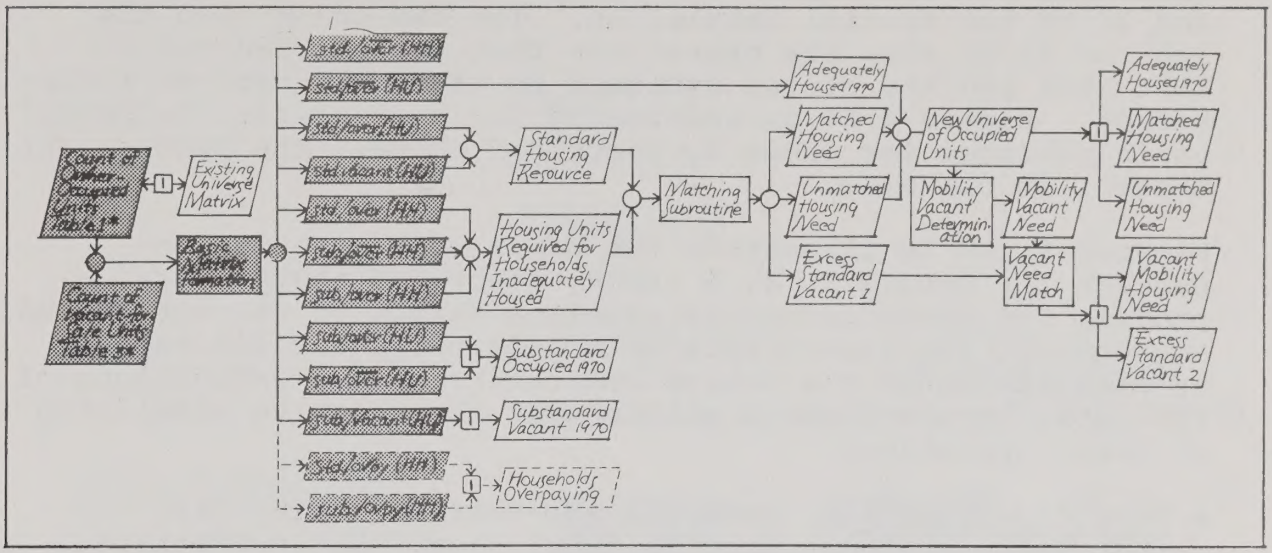
• Step 2f. Assemble the vectors formed in Step 2e in ascending order (left to right), according to the bedrooms per unit category each vector represents (i.e., 0-1-2-3-4+). The resulting three by five grid matrix is the converted value/rent by bedrooms output matrix. (See Figure 6.)

FIGURE 6: Bedrooms Matrices

	OWNERS Bedrooms per Unit					
VALUE	0	1	2	3	4+	TOTAL
Less Than $20,000						
$20-34,999						
$35,000+						
TOTAL						

	RENTERS Bedrooms per Unit					
GROSS RENT	0	1	2	3	4+	TOTAL
Less Than $100						
$100-199						
$200+						
TOTAL						

Process #3 Basic Matrix Formation



This process sorts the housing stock (owners or renters) into "basic matrices" which eliminate the problems of overlap and double-counting of the data. Within the basic matrices there is no need to estimate the distribution of housing units by value/rent and size, as each basic matrix contains the distribution directly from the data base.

For owner-occupied and vacant-for-sale units, there are basic categories in which housing units can be found. Each of those categories is represented by a basic matrix. Labels for each are listed below,* in the four groups in which they are formed.

Group 1	Group 2	Group 3	Group 4
STD/OVCR (HU)	SUB/OVCR (HU)	STD/VACANT (HU)	SUB/VACANT (HU)
STD/OVCR (HH)	SUB/OVCR (HH)		
STD/$\overline{\text{OVCR}}$ (HU)	SUB/$\overline{\text{OVCR}}$ (HU)		
STD/$\overline{\text{OVCR}}$ (HH)	SUB/$\overline{\text{OVCR}}$ (HH)		

Basic matrices for renter-occupied and vacant-for-rent units are the same as for owners with the addition of the following two groups:

Group 5	Group 6
STD/OVPY (HH)	SUB/OVPY (HH)

*STD = STANDARD
SUB = SUBSTANDARD
OVCR = OVERCROWDED
$\overline{\text{OVCR}}$ = NOT OVERCROWDED
(HU) = (HOUSING UNITS)
(HH) = (HOUSEHOLDS)
OVPY = OVERPAYING
$\overline{\text{OVPY}}$ = NOT OVERPAYING

Figure 7 graphically portrays the concept of basic matrix formation. The middle column C of matrices represents the data that is directly extracted and aggregated from Tables I and II of the special tabulation. The two columns to the left or right show the operations that are carried out on that data and the status assigned to the newly derived information. Figure 8 is an example of the process for "building" basic matrices for Group 2, described above. The process for Group 1 is the same.

Figures 9 and 10 illustrate the basic matrix formation process for Groups 3, 4, 5 and 6, described above. The process for those groups is simply a matter of extracting and aggregating the appropriate data from the indicated tables. An examination of the Tables and review of the definitions of the terms in the figures will reveal the relative simplicity of these operations.

- Step 3a (Group 2). Form six sub-matrices using data from Table I of the special tabulation. The submatrices make up column C of the diagram. Each is a 3 by 6 matrix (value by rooms) illustrating one of the following combinations of housing unit characteristics:

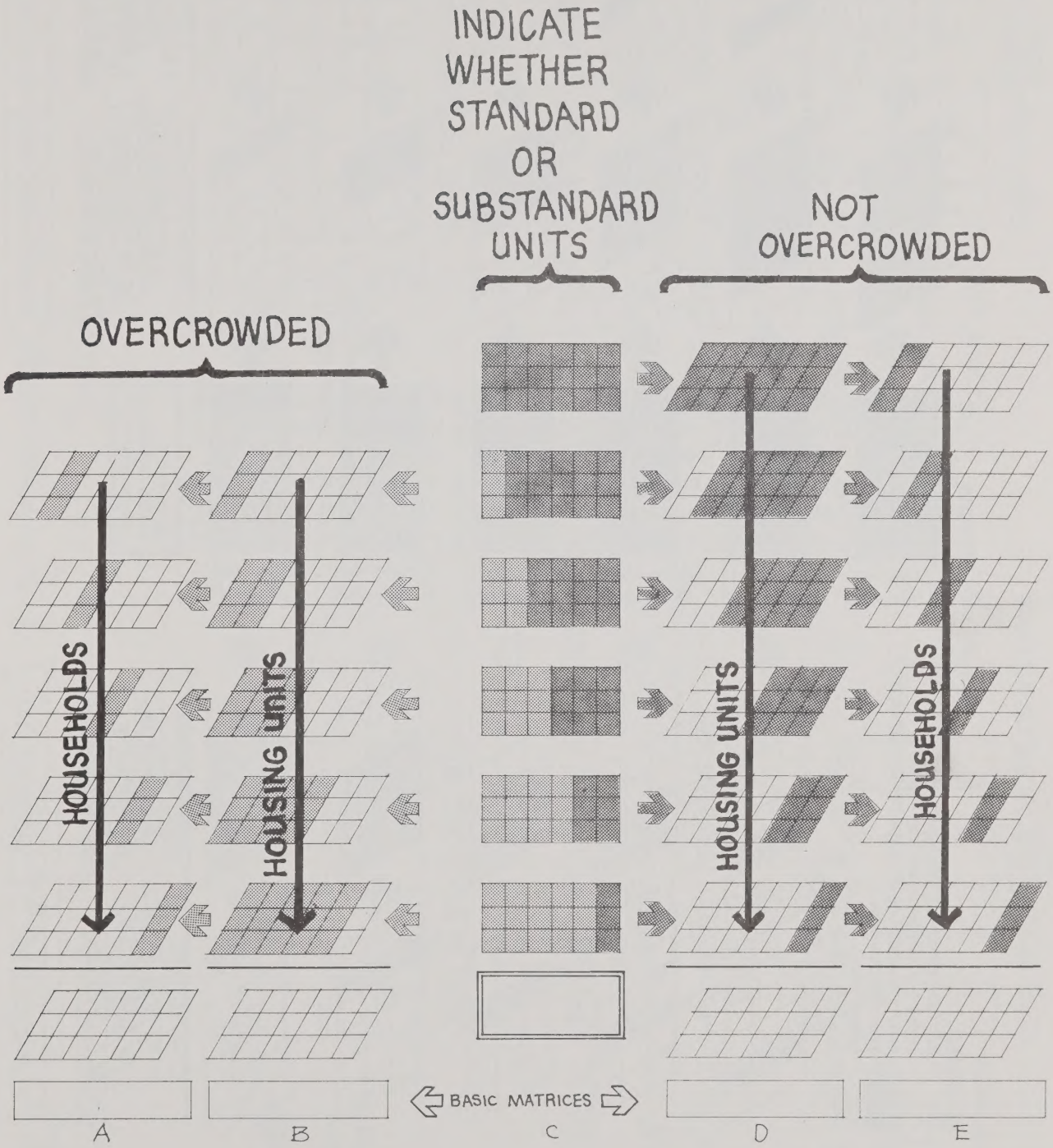
Submatrix	Condition	Persons per Unit
(1)	Substandard	1 person
(2)	Substandard	2 persons
(3)	Substandard	3 persons
(4)	Substandard	4 persons
(5)	Substandard	5 persons
(6)	Substandard	6+ persons

- Step 3b (Group 2). Separate "overcrowded" units from "not overcrowded" for each submatrix to form columns B and D of the diagram. Overcrowded units are those where the number of persons in the unit exceed the number of rooms in the unit. Those units become the separated submatrices in column B. For example, all one- and two-room units in the three-person submatrix (i.e., submatrix (3)) are considered overcrowded and placed in column B. The remainder of that submatrix (3 to 6+ rooms per unit) are considered "not overcrowded" and placed in column D.

- Step 3c (Group 2). Aggregate the separated submatrices developed in Step 3b for columns B and D. That is accomplished by adding the five or six separated submatrices in each column on a corresponding cell basis. The resulting basic matrix in column B is labeled "SUB/$\overline{\text{OVCR}}$(HU)" and the matrix in column D is labeled "SUB/$\overline{\text{OVCR}}$(HU)."

Figure 7

BASIC MATRIX FORMATION – DATA MANIPULATION CONCEPT



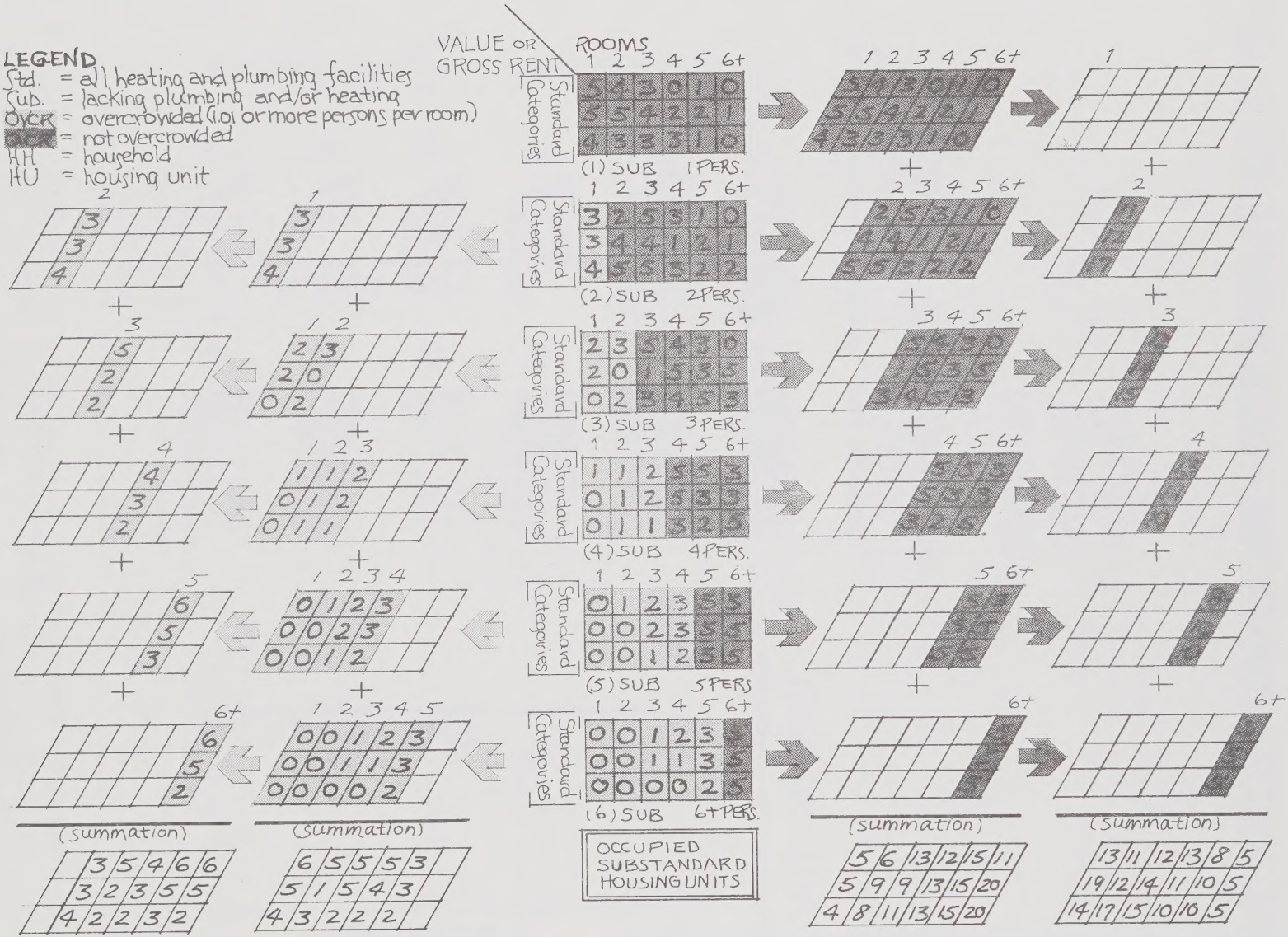
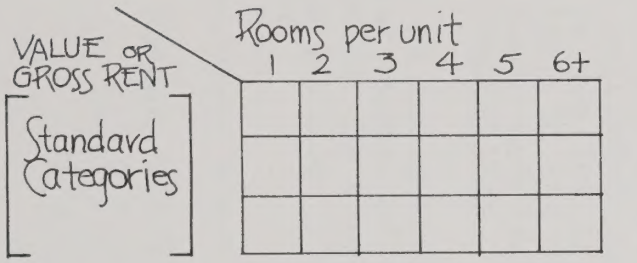


FIGURE 8
BASIC MATRIX FORMATION (EXAMPLE-GROUP 2)

FIGURE 9
BASIC MATRIX FORMATION · VACANT HOUSING UNITS (GROUPS 3 AND 4)

GROUP 3 - STD/VACANT (HU)

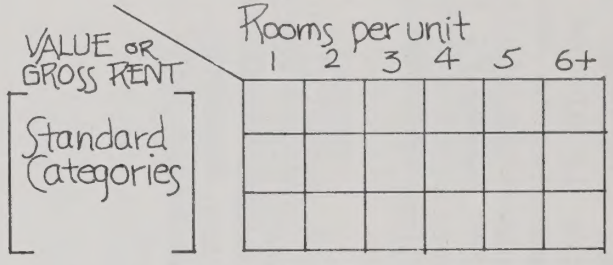
Data Base: Special Tabulation
Table III (owners)
Table IV (renters)



UNITS IN STANDARD COND.

GROUP 4 - SUB/VACANT (HU)

Data Base: Special Tabulation
Table III (owners)
Table IV (renters)

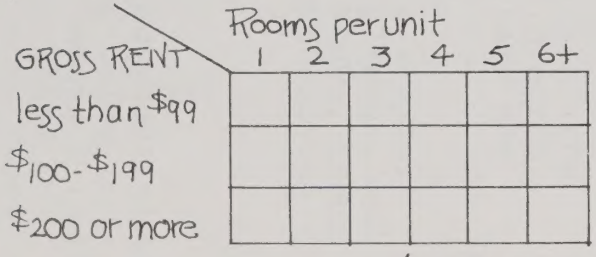


UNITS IN SUBSTANDARD COND.

FIGURE 10
BASIC MATRIX FORMATION · OVERPAYING HOUSEHOLDS (GROUPS 5 AND 6)

GROUP 5 - STD/OVPY (HH)

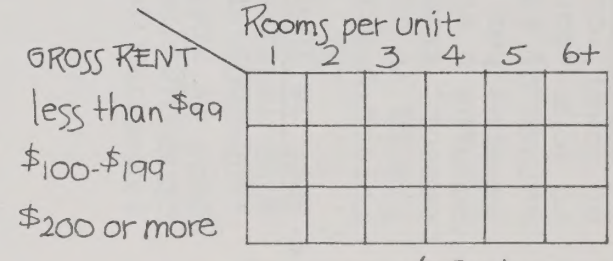
Data Base: Special Tabulation
Table II



STD. COND. / GROSS RENT > 25% OF INCOME

GROUP 6 - SUB/OVPY (HH)

Data Base: Special Tabulation
Table II

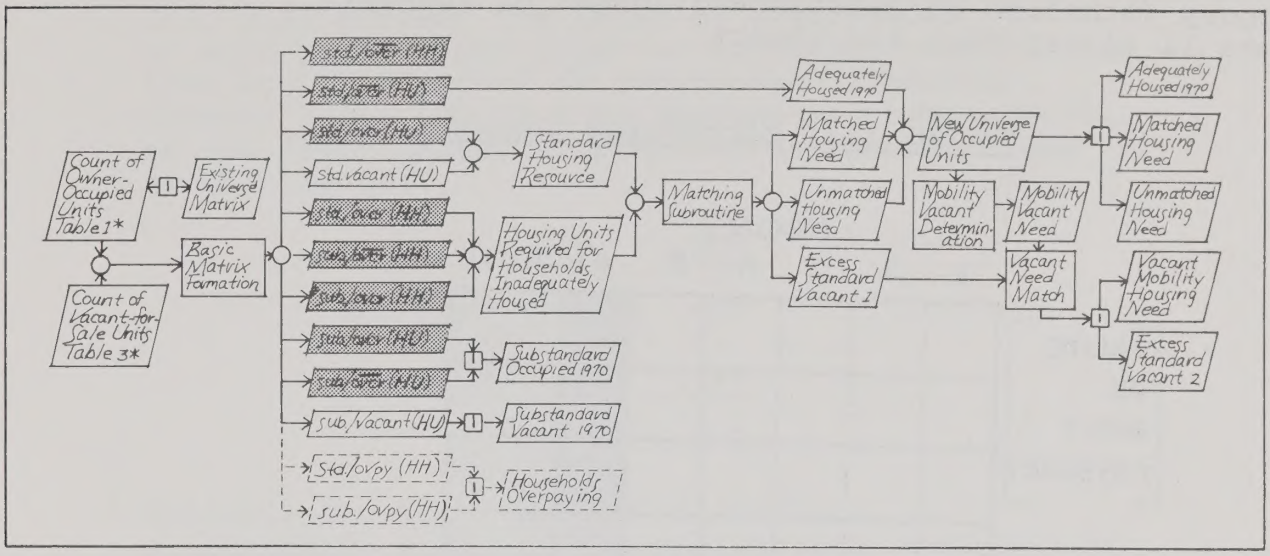


SUB. COND. / GROSS RENT > 25% OF INCOME

- Step 3d (Group 2). Aggregate by value (i.e., horizontally by rows), column B and D submatrices developed in Step 3b to form "total vectors." Each vector is placed in a room column of the new submatrix corresponding to the number of persons per unit of the original submatrix (this forms columns A and E of the diagram). For example, the "total vector" from the three-person submatrix of column B is placed in the three-room column of the appropriate column A submatrix.

- Step 3e (Group 2). Add the column A submatrices as was done in Step 3c. Label the resulting basic matrix "SUB/OVCR(HH)". Add the column E submatrices as was done in Step 3c. Label the resulting matrix "SUB/$\overline{\text{OVCR}}$(HH)". That completes the basic matrix formation for Group 2.

Process #4 Overcrowding Correction Procedure



The Second Estimate methodology cannot determine the number of overcrowded households in housing units of six or more rooms. Because the "rooms per unit" and "persons per household" categories are open-ended, no comparison between persons and rooms can be made to indicate overcrowded conditions. The problem affects calculations in only three cells of the matrix, but was significant enough to require that a procedure be developed to correct the apparent undercount of overcrowded units in each jurisdiction. This procedure is applied after the initial formation of the basic matrices in the Second Estimate computer program. Corrected basic matrices are then used to complete the remaining compuations.

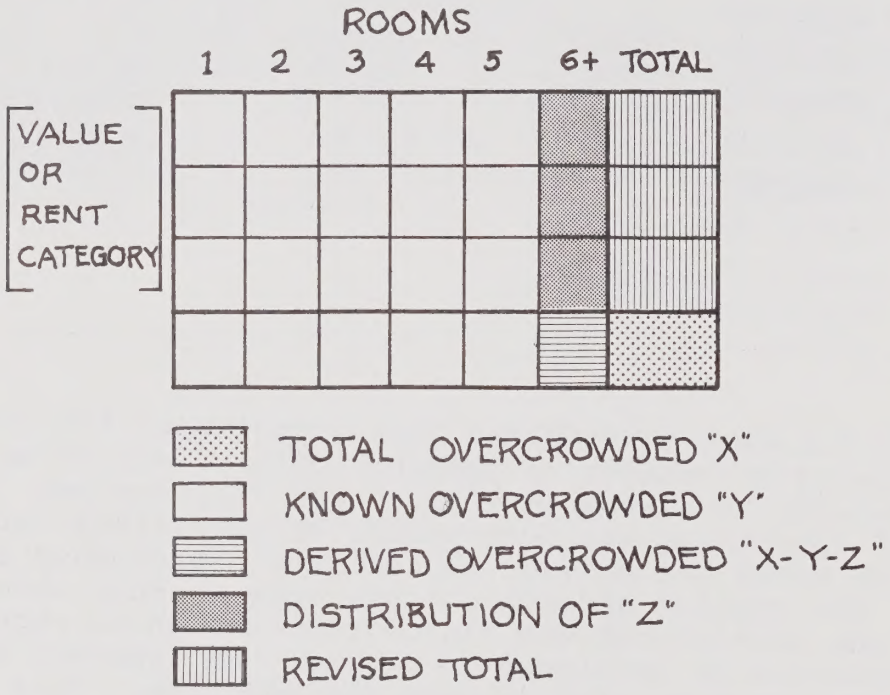
The theory of the correction procedure is quite simple: if the total number of overcrowded units "x" is known, and "y" portion of the total overcrowded units is known, then the unknown portion "z" can be determined by subtracting "y" from "x".

Therefore: $x - y = z$

Where: x = the total number of overcrowded units
y = the number of overcrowded units in unit-size categories 1 through 5 rooms
z = the number of overcrowded units in unit-size category "6 or more rooms"

Distribution of the units determined for "z" within the three matrix cells for the "six or more rooms" category is made assuming that the distribution is proportional to the distribution of all housing units in the "six or more rooms" category (standard or substandard, owner or renter). Figure 11 illustrates the theory.

FIGURE 11: Correction Theory



- Step 4a. Obtain the printouts of the basic matrix formation process with the output matrices in their appropriate "groups."

- Step 4b. Determine "x" for each jurisdiction in the following situations:

    a. standard owner units
    b. substandard owner units
    c. standard renter units
    d. substandard renter units

  For cities of 50,000 or more population, central cities of SMSA's, and SMSA counties, use tabulation J070 of the Sixth Count Housing Tape as the data base. For cities and places of 25,000 to 50,000 population, use the table

entitled "overcrowded units (estimates)" from the First Estimate as the data base.

J070 will present the count of overcrowded (1.01 or more persons per room) or not overcrowded units that are in standard or substandard condition. Convert those counts into percentages overcrowded or not overcrowded, standard or substandard (see example below).

	STD	SUB
Not OVCR	.975	.935
OVCR	.025	.065
	1.000	1.000

Multiply the total number of standard (or substandard) units by the appropriate overcrowding percentage. The result will be the total number of overcrowded units "x".

For cities using the First Estimate data base, the number of standard (or substandard) overcrowded units is proportional to the number of standard (or substandard) total units in the jurisdiction. Once that number has been determined, proceed as with the larger jurisdictions to determine "x".

- Step 4c. Determine "y", which is simply the total number of units in any basic matrix with the title (STD or SUB)/OVCR(HU).

- Step 4d. Subtract "y" from "x" to determine "z", the total number of overcrowded units in the six or more rooms category. Place this number in the "totals" cell for six or more rooms in the (STD or SUB)/OVCR(HU) matrix.

- Step 4e. Distribute "z" among the three cells in the six or more rooms category of the (STD or SUB)/OVCR(HU) matrix, in proportion with the distribution of units in the same cells of the (STD or SUB)/N.OVCR(HH) matrix of the same basic matrices group. There are three conditions under which this distribution is carried out:

  a. if the cells for this column in the (STD or SUB)/N.OVCR(HH) matrix are all zeros, then no correction is made to the matrices in that group;

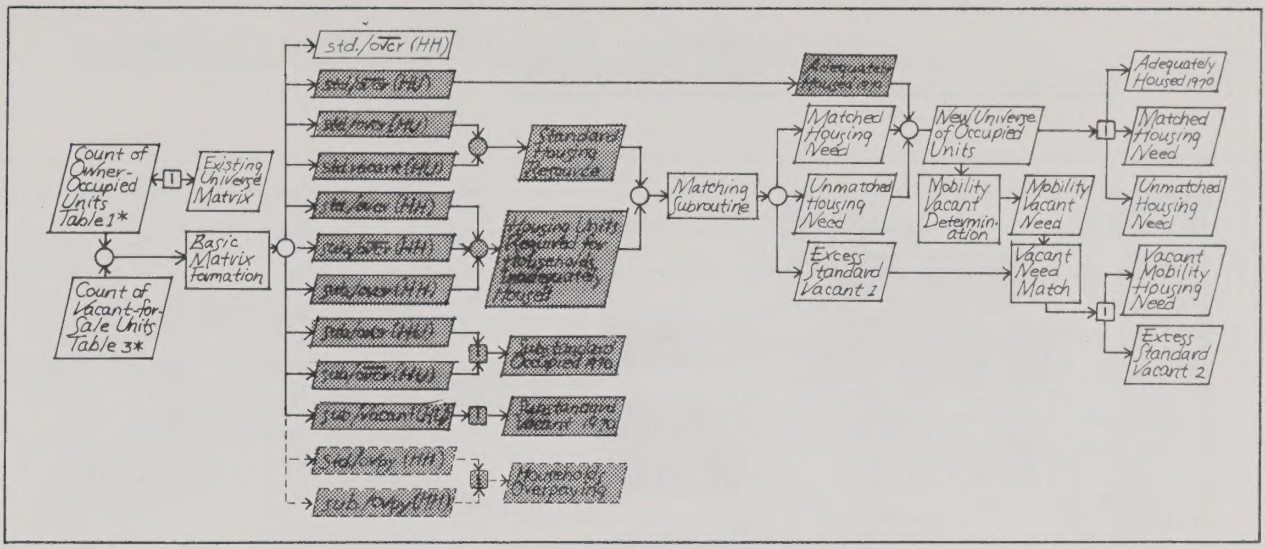
b. if the total number of six or more rooms units in the (STD or SUB)/N.OVCR(HH) matrix is less than "z", then the number of units that can be distributed cannot exceed that total;

c. if the total number of six or more rooms units in the (STD or SUB)/N.OVCR(HH) matrix is greater than "z", then the distribution is proportional to the count in each of the six or more rooms units cells.

- Step 4f. After the distribution has been made in the (STD or SUB)/OVCR(HU) matrix, add the same number of units to the corresponding cells in the (STD or SUB)/OVCR(HH) matrix. Subtract the same number of units from the corresponding cells of the (STD or SUB)/N.OVCR(HU) and (STD or SUB)/N.OVCR(HH) matrices. If no distribution has been made, do not alter any other matrix in that basic matrix group.

That completes the correction procedure. The results are placed on computer cards and input to the main computer program for the Second Estimate Methodology.

Process #5 Combining Basic Matrices



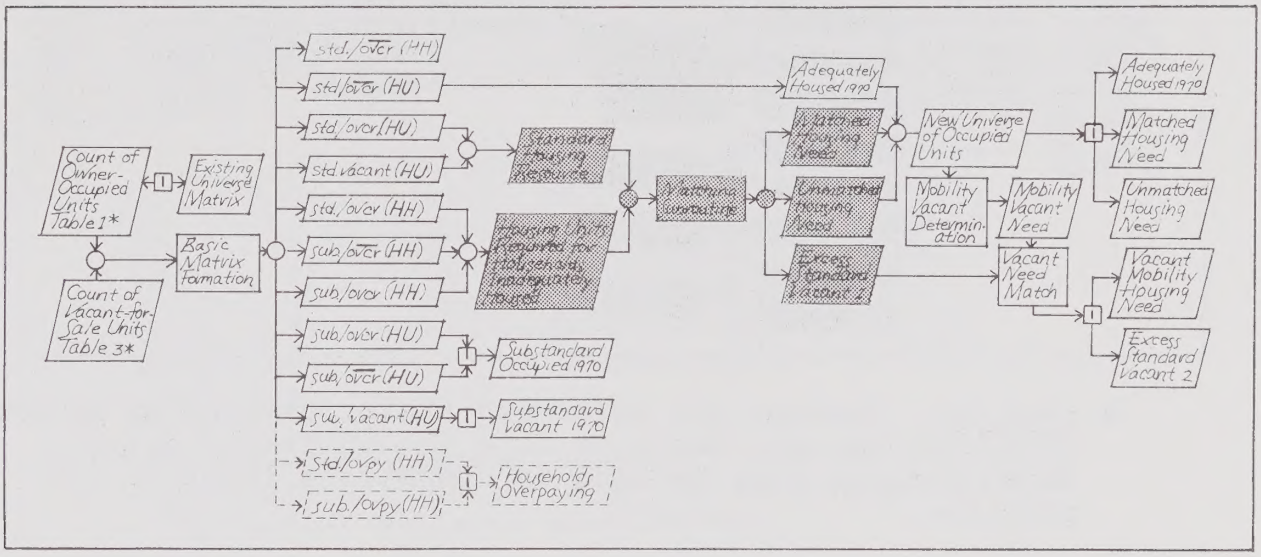
- Step 5a. Combine the following basic matrices by adding on a cell-by-cell basis to form the indicated outputs. Those outputs will be used in operations later in the program.

Basic Matrices				Output
STD/OVCR(HU)	+ STD/VACANT(HU)		=	STANDARD HOUSING RESOURCE
STD/OVCR(HH)	+ SUB/OVCR(HH)	+ SUB/$\overline{\text{OVCR}}$(HH)	=	HOUSING UNITS REQUIRED FOR HOUSEHOLDS INADEQUATELY HOUSED
SUB/OVCR(HU)	+ SUB/$\overline{\text{OVCR}}$(HU)		=	SUBSTANDARD OCCUPIED 1970
STD/$\overline{\text{OVCR}}$(HU)			=	ADEQUATELY HOUSED 1970
SUB/VACANT(HU)			=	SUBSTANDARD VACANT 1970

FOR RENTERS:

STD/OVPY(HH)	+ SUB/OVPY(HH)		=	HOUSHOLDS OVERPAYING

Process #6 Matching Subroutine



The matching subroutine is the part of the program that combines the output matrices for "Housing Units Required for Households Inadequately Housed" and "Standard Housing Resource" to determine part of the housing need for a locality. There are four steps in this process:

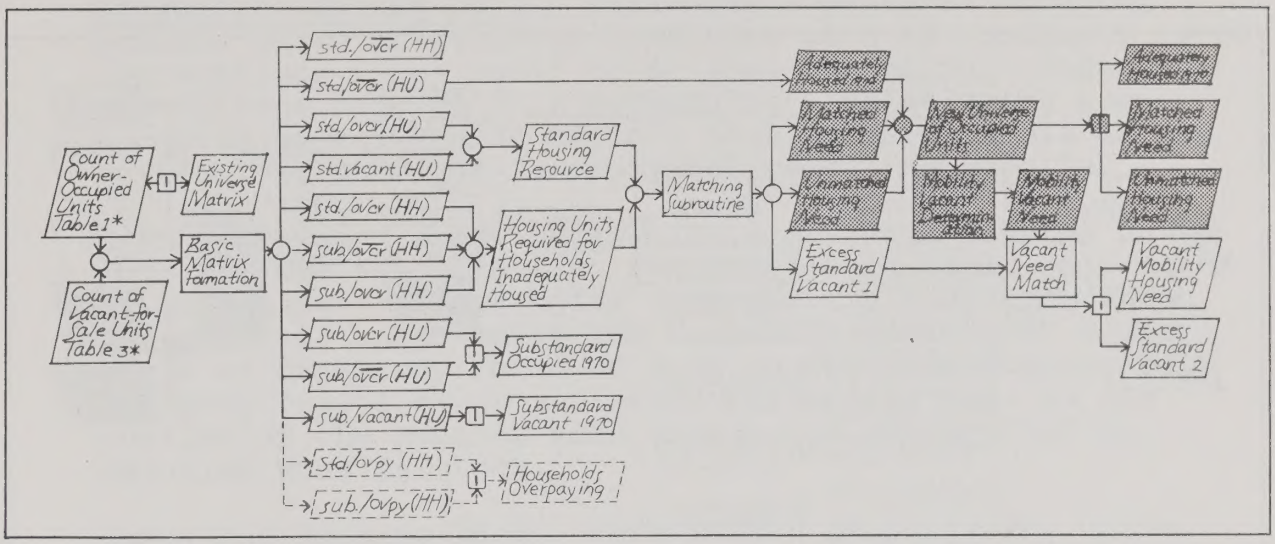
- Step 6a. Subtract the "Standard Housing Resource" matrix from the "Housing Units Required for Households Inadequately Housed" matrix. The resulting matrix may have negative numbers in some of the cells.

- Step 6b. Develop a new output matrix called "Excess Standard Vacant$_1$" by taking any negative numbers in the Step 1 matrix and placing them in corresponding cells on a new 3 by 6 grid. Convert the negative numbers to positive numbers. If there are no negative numbers in the Step 1 matrix the "Excess Standard Vacant$_1$" output matrix will be all zeros.

- Step 6c. Replace any negative numbers on the Step 1 matrix with zeros. That new output matrix is called "Unmatched Housing Need."

- Step 6d. Subtract the "Excess Standard Vacant$_1$" output matrix from "Standard Housing Resource." That new output matrix is called "Matched Housing Need."

Process #7 Mobility Vacant Determination



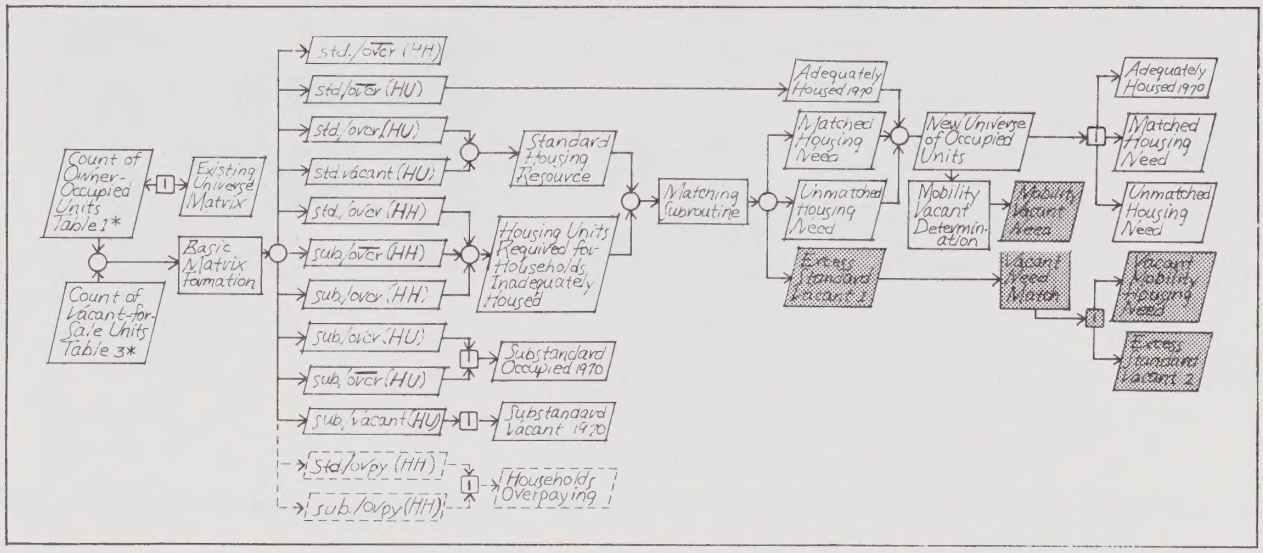
The process entitled, "Mobility Vacant Determination," uses three of the output matrices previously developed (see flow diagram):

1. Adequately Housed 1970
2. Matched Housing Need
3. Unmatched Housing Need

- Step 7a. Add the above matrices on a corresponding cell basis. The resulting matrix is called "New Universe of Occupied Units." The above "rooms" matrices should also be converted to "bedrooms" matrices.

- Step 7b. For owner units, divide each cell of the Step 1 matrix by the vacant mobility factor for owners (99). For renter units, divide each cell of the Step 1 matrix by the vacant mobility factor for renters (95.5). The resulting output matrices are labeled "Mobility Vacant Need."

Process #8 Vacant Need Match



The process entitled "Vacant Need Match" uses two of the output matrices previosuly developed (see flow diagram):

1. Mobility Vacant Need
2. Excess Standard Vacant$_1$

- Step 8a. Subtract "Excess Standard Vacant$_1$" from "Mobility Vacant Need." The resulting output matrix is labeled "Mobility Vacant Housing Need." Any negative numbers should be placed in corresponding cells on a new matrix and changed to positive numbers. That matrix is referred to as "Excess Standard Vacant$_2$." Be sure the output matrices are converted to "bedrooms" matrices.

SIGNIFICANT FINAL OUTPUTS

Adequately Housed 1970. This matrix presents occupied housing units in standard condition with an occupancy ratio (persons per room) equal to or less than 1.00. Under the assumptions made in this methodology, these units are occupied by households without housing need. This matrix does not account for "overpaying" rental households.

Matched Housing Need. This matrix presents housing units from the "standard housing resource" that could be matched to the needs of "households inadequately housed." These are standard units where the household/unit match would yield an occupancy ratio of 1.00 in the same housing cost category (value or gross rent). In short, this is the portion of the housing need that could be provided by existing housing stock.

Unmatched Housing Need. This matrix presents the units that need to be added (either newly constructed, rehabilitated or converted, or appropriate units in other price categories--subsidized if necessary) to the existing standard housing stock for inadequately housed households that could not be matched by the standard housing resource. Provision of these units (under the assumptions of the Second Estimate) would result in a household/unit match that would yield an occupancy ratio of 1.00 in the same cost category held by the household.

Vacant Mobility Housing Need. This matrix presents the number of standard units that must be added (newly constructed, rehabilitated or converted) to the existing housing stock to provide an adequate number of standard vacant units for mobility purposes. The number of units indicated takes into account the standard housing resource units not previously allocated in the matching process.

Excess Standard Vacant$_2$. This matrix presents the residual of the standard housing resource that was not matched to inadequately housed households because the need required housing units of a different cost category or would have resulted in an "overhoused" occupancy ratio of less than 1.00 or was needed for mobility vacant purposes. Jurisdictions may want to use this residual to "fill" some of the unmatched housing need. Such use assumes "overhousing", as defined in this study, to be an acceptable local policy for determining housing need.

Households Overpaying. This matrix presents those rental households whose gross rent amounted to 25% or more of their household income. There is no similar matrix for owner households. As indicated in the main body of this report, information or overpaying is important to decision-making on local housing policy.

APPENDIX 3

Computer Program Documentation

I. TAPE CONVERSION PROGRAM

Program SPHOS was used to convert the original SPECIAL HOUSING TABULATIONS tape from a 9-track, EBCDIC tape to a binary tape suitable for use on the CDC-6600. In addition, several other modifications were made to the original tape structure to ease handling in the NEEDS program (section III).

First, the original data record was split into six records corresponding to the six tabulations for each area. Also, an identifier was added to each record; it includes area name, area code, population, etc. (see section II). These identifiers were gathered and added as the first record on the output tape to provide an index to the data records.

The county data was added for each tabulation to give a total for the ABAG jurisdiction. Lastly, the areas were rearranged so that the ABAG total is first followed by the county records followed by the places.

For a more detailed description of the program, see the program listing.*

II. CDC-6600 VERSION OF THE SPECIAL HOUSING TABULATION TAPE

The output tape from program SPHOS (section I) contains 283 records arranged in the following way:

```
  1 index record
  6 total records, tabs 1 to 6
 54 records for the 9 counties, tabs 1 to 6
222 records for the 37 places, tabs 1 to 6
```

RECORD 1--INDEX RECORD

```
READ(FILE) K,((INX(I,J),I=1,6),J=1,K)
```

K is the number of data records (282 on current tape)

INX(I,J) - J being the record number

```
I = 1 number of data items in the tab
    2 tab number (1 to 6)
    3 category (0=ABAG total, 1=county, 2=place)
    4 population
    5 FIPS county code
    6 FIPS place code (zero for county records)
 7- 8 county name (display code)
9-10 place name (display code)
```

RECORDS 2-283--DATA RECORDS

```
READ(FILE) (ID(I),I=1,10),(IN(I),I=1,N)
```

where N is equivalenced to ID(1)

The ID array has the same information, word for word, as the ten items in the INX array in record 1.

The IN array contains the data for the tab.

The index record may be used for skipping up to a particular record, making the file psuedo-random.

III. NEED CALCULATION PROGRAM

Program NEED is a combination of two programs. the first section combines tabs 1, 2, 5 and 6 from the first special housing tape with tabs 3 and 4 of the corrected special housing tape. The original version had errors on tabs 3 and 4; the corrected tape was slightly modified by the census bureau on tabs 1 and 2.

When the program was run for the first time, it was seen that the basic matrices needed some corrections. Correction cards were punched and the program was modified to read and store the corrections and apply them after the basic matrices were formed. New totals were also made. Once the basic matrices for all the areas were formed and stored, the second section of the program is executed. The final matrices are derived by suitable matrix addition, subtraction, conversion, etc., to the basic matrices. Two types of totals are calculated: one is derived from the total basic matrices; the other is a sum of the derived matrices. A separate print is made for owner matrices and renter matrices.

See the program listing for a more detailed description.*

*The program listings for the above descriptions are lengthy and have not been included in this report. The listings can be made available on request.

APPENDIX 4

Second Estimate of Housing Need, 1970
Bay Area Totals

Appendix 4 presents input/output matrices developed in the Second Estimate methodology for the nine-county Bay Area. The need estimate is presented first for owner-occupied and vacant-for-sale units, and second for renter-occupied and vacant-for-rent units. The following list identifies the matrices (owner or renter) presented in Appendix 4:

Page 1
Existing Universe Matrix (Rooms)
Existing Universe Matrix (Bedrooms)

Page 2
STD/OVCR(HH)
STD/OVCR(HU)
Occupied Standard (Total)
STD/N.OVCR(HU)
STD/N.OVCR(HH)

Page 3
SUB/OVCR(HH)
SUB/OVCR(HU)
Occupied Substandard (Total)
SUB/N.OVCR(HU)
SUB/N.OVCR(HH)

Page 4
STD/VACANT(HU)
SUB/VACANT(HU)
STD/OVPY(HH) [Renters Only]
SUB/OVPY(HH) [Renters Only]

Page 5
STANDARD HOUSING RESOURCE
HOUSING UNITS FOR HOUSEHOLDS INADEQUATELY HOUSED
SUBSTANDARD, OCCUPIED, 1970
SUBSTANDARD, VACANT, 1970

Page 6
ADEQUATELY HOUSED 1970
MATCHED HOUSING NEED
UNMATCHED HOUSING NEED
EXCESS STANDARD VACANT(1) (ROOMS)

Page 7
NEW UNIVERSE OF OCCUPIED UNITS
MOBILITY VACANT NEED

Page 8
ADEQUATELY HOUSED 1970 (BEDROOMS)
MATCHED HOUSING NEED(BEDROOMS)
UNMATCHED HOUSING NEED (BEDROOMS)
MOBILITY VACANT HOUSING NEEDS
EXCESS STANDARD VACANT (2)

Page 9
CONVERSION MATRICES (PERCENTAGES)

SECOND ESTIMATE

OF

BAY AREA HOUSING NEED, 1970

FOR THE

ABAG DERIVED TOTAL

ASSOCIATION OF BAY AREA GOVERNMENTS

SEPTEMBER 1975

NOTE 1. - THE VALUE CATEGORY -$35,000 AND OVER- INCLUDES COOPERATIVES, CONDOMINIUMS, OWNER-OCCUPIED MULTIPLE UNIT DWELLINGS AND OWNER-OCCUPIED SINGLE FAMILY DWELLINGS ON TEN OR MORE ACRES OF LAND

NOTE 2. - THE DECIMAL PART OF THE VALUES IN THE TABLES IS NOT PRINTED. AS A RESULT, THERE WILL BE ROUND-OFF ERROR IN THE TOTALS.

OWNERS - ABAG DERIVED TOTAL

OWNERS - EXISTING UNIVERSE MATRIX

	ROOMS						
VALUE	1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	265	1247	6574	36155	79196	45863	169300
$20,00 TO 34,999	235	839	3758	22996	146774	250485	425147
$35,000 AND ABOVE	1703	3974	14644	27962	40265	174535	263083
TOTAL	2203	6120	24976	87113	266235	470883	857530

OWNERS - EXISTING UNIVERSE MATRIX

	BEDROOMS					
VALUE	0	1	2	3	4+	TOTAL
LESS THAN $20,000	976	12340	76375	71648	8361	169300
$20,00 TO 34,999	406	7496	95720	246279	75245	425147
$35,000 AND ABOVE	2318	20647	60882	92334	86903	263083
TOTAL	3300	40482	232977	410261	170509	857530

OWNERS - ABAG DERIVED TOTAL

BASIC MATRICES, GROUP 1

OWNERS - STD / OVCR (HH)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	0	66	189	315	1534	9372	11476
$20,00 TO 34,999	0	40	190	682	1102	16728	18742
$35,000 AND ABOVE	0	353	276	543	778	7008	8958
TOTAL	0	459	655	1540	3414	33108	39176

OWNERS - STD / OVCR (HU)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	66	391	720	2389	6215	1696	11477
$20,00 TO 34,999	126	340	1006	1408	7813	8049	18742
$35,000 AND ABOVE	503	464	584	1127	1442	4838	8958
TOTAL	695	1195	2310	4924	15470	14583	39177

OWNERS - OCCUPIED STANDARD (TOTAL)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	66	1072	5732	34085	75577	43501	160033
$20,00 TO 34,999	213	761	3480	22311	143192	244707	414664
$35,000 AND ABOVE	1334	3520	13533	26679	38146	170185	253397
TOTAL	1613	5353	22745	83075	256915	458393	828094

OWNERS - STD / N.OVCR (HU)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	0	681	5012	31696	69362	41805	148556
$20,00 TO 34,999	87	421	2474	20903	135379	236658	395922
$35,000 AND ABOVE	831	3056	12949	25552	36704	165347	244439
TOTAL	918	4158	20435	78151	241445	443810	788917

NOTE 1. - THE ABOVE BASIC MATRICES ARE PRESENTED AFTER THE APPLICATION OF THE OVERCROWDING CORRECTION PROCEDURE FOR UNITS OF SIX OR MORE ROOMS.

NOTE 2. - THE BASIC MATRIX -STD/N.OVCR (HH)- IS NOT PRESENTED BECAUSE IT DOES NOT PLAY A ROLE IN FURTHER CALCULATIONS.

OWNERS - ABAG DERIVED TOTAL

BASIC MATRICES, GROUP 2

OWNERS - SUB / OVCR (HH)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	0	41	41	16	112	602	812
$20,00 TO 34,999	0	22	19	48	61	436	586
$35,000 AND ABOVE	0	54	35	127	126	419	761
TOTAL	0	117	95	191	299	1457	2159

OWNERS - SUB / OVCR (HU)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	107	36	105	93	340	131	812
$20,00 TO 34,999	22	58	65	60	174	207	586
$35,000 AND ABOVE	96	53	116	116	249	131	761
TOTAL	225	147	286	269	763	469	2159

OWNERS - OCCUPIED SUBSTANDARD (TOTAL)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	186	154	754	1637	2713	1941	7385
$20,00 TO 34,999	22	120	214	540	2544	3353	6793
$35,000 AND ABOVE	369	454	1111	1271	1889	2525	7619
TOTAL	577	728	2079	3448	7146	7819	21797

OWNERS - SUB / N.OVCR (HU)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	79	118	649	1544	2373	1810	6573
$20,00 TO 34,999	0	62	149	480	2370	3146	6207
$35,000 AND ABOVE	273	401	995	1155	1640	2394	6858
TOTAL	352	581	1793	3179	6383	7350	19638

OWNERS - SUB / N.OVCR (HH)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	2120	2127	912	775	356	283	6573
$20,00 TO 34,999	998	2085	1024	968	695	437	6207
$35,000 AND ABOVE	2072	2642	830	649	370	295	6858
TOTAL	5190	6854	2766	2392	1421	1015	19638

NOTE 1. - THE ABOVE BASIC MATRICES ARE PRESENTED AFTER THE APPLICATION OF THE OVERCROWDING CORRECTION PROCEDURE FOR UNITS OF SIX OR MORE ROOMS.

OWNERS - ABAG DERIVED TOTAL

BASIC MATRICES, GROUPS 3 AND 4

OWNERS - STD / VACANT (HU)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	0	21	75	389	825	380	1690
$20,00 TO 34,999	0	0	44	114	1021	2373	3552
$35,000 AND ABOVE	0	0	0	12	230	1825	2067
TOTAL	0	21	119	515	2076	4578	7309

OWNERS - SUB / VACANT (HU)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	13	0	13	44	81	41	192
$20,00 TO 34,999	0	18	20	31	17	52	138
$35,000 AND ABOVE	0	0	0	0	0	0	0
TOTAL	13	18	33	75	98	93	330

OWNERS - ABAG DERIVED TOTAL

OWNERS - STANDARD HOUSING RESOURCE

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	66	412	795	2778	7040	2076	13167
$20,00 TO 34,999	126	340	1050	1522	8834	10422	22294
$35,000 AND ABOVE	503	464	584	1139	1672	6663	11025
TOTAL	695	1216	2429	5439	17546	19161	46486

OWNERS - HOUSING UNITS REQUIRED FOR HOUSEHOLDS INADEQUATELY HOUSED

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	2120	2234	1142	1106	2002	10257	18861
$20,00 TO 34,999	998	2147	1233	1698	1858	17601	25535
$35,000 AND ABOVE	2072	3049	1141	1319	1274	7722	16577
TOTAL	5190	7430	3516	4123	5134	35580	60973

OWNERS - SUBSTANDARD OCCUPIED, 1970

VALUE	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $20,000	224	987	3096	2729	349	7385
$20,00 TO 34,999	43	328	1755	3655	1012	6793
$35,000 AND ABOVE	433	1505	2560	1845	1276	7619
TOTAL	700	2820	7411	8229	2637	21797

OWNERS - SUBSTANDARD VACANT, 1970

VALUE	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $20,000	13	17	84	69	8	192
$20,00 TO 34,999	3	32	43	45	16	138
$35,000 AND ABOVE	0	0	0	0	0	0
TOTAL	16	49	127	115	23	330

OWNERS - ABAG DERIVED TOTAL

OWNERS - ADEQUATELY HOUSED, 1970

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	0	681	5012	31696	69362	41805	148556
$20,00 TO 34,999	87	421	2474	20903	135379	236658	395922
$35,000 AND ABOVE	831	3056	12949	25552	36704	165347	244439
TOTAL	918	4158	20435	78151	241445	443810	788917

OWNERS - MATCHED HOUSING NEED

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	66	412	795	1106	2002	2076	6457
$20,00 TO 34,999	126	340	1050	1522	1858	10422	15318
$35,000 AND ABOVE	503	464	584	1139	1274	6663	10627
TOTAL	695	1216	2429	3767	5134	19161	32402

OWNERS - UNMATCHED HOUSING NEED

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	2054	1822	347	0	0	8181	12404
$20,00 TO 34,999	872	1807	183	176	0	7179	10217
$35,000 AND ABOVE	1569	2585	557	180	0	1059	5950
TOTAL	4495	6214	1087	356	0	16419	28571

OWNERS - EXCESS STANDARD VACANT (1)

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	0	0	0	1672	5038	0	6710
$20,00 TO 34,999	0	0	0	0	6976	0	6976
$35,000 AND ABOVE	0	0	0	0	398	0	398
TOTAL	0	0	0	1672	12412	0	14084

OWNERS - ABAG DERIVED TOTAL

OWNERS - NEW UNIVERSE OF OCCUPIED UNITS

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	2120	2915	6154	32802	71364	52062	167417
$20,00 TO 34,999	1085	2568	3707	22601	137237	254259	421457
$35,000 AND ABOVE	2903	6105	14090	26871	37978	173069	261016
TOTAL	6108	11588	23951	82274	246579	479390	849890

OWNERS - MOBILITY VACANT NEED

VALUE	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $20,000	21	29	62	331	721	526	1691
$20,00 TO 34,999	11	26	37	228	1386	2568	4257
$35,000 AND ABOVE	29	62	142	271	384	1748	2637
TOTAL	62	117	242	831	2491	4842	8585

OWNERS - ABAG DERIVED TOTAL

OWNERS - ADEQUATELY HOUSED, 1970

VALUE	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $20,000	189	9891	66980	63894	7602	148556
$20,00 TO 34,999	172	5883	88116	230686	71065	395922
$35,000 AND ABOVE	1322	18043	55854	86912	82307	244439
TOTAL	1683	33817	210951	381493	160974	788917

OWNERS - MATCHED HOUSING NEED

VALUE	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $20,000	150	1155	2326	2458	368	6457
$20,00 TO 34,999	189	1174	3061	7798	3096	15318
$35,000 AND ABOVE	563	1088	2229	3434	3314	10627
TOTAL	901	3417	7016	13691	6778	32402

OWNERS - UNMATCHED HOUSING NEED

VALUE	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $20,000	2383	1828	1093	5706	1395	12404
$20,00 TO 34,999	1173	1667	704	4551	2123	10217
$35,000 AND ABOVE	1871	2743	339	473	524	5950
TOTAL	5426	6238	2136	10730	4041	28571

OWNERS - MOBILITY VACANT HOUSING NEED

VALUE	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $20,000	27	77	78	367	90	639
$20,00 TO 34,999	15	72	382	1641	759	2871
$35,000 AND ABOVE	38	210	360	780	865	2253
TOTAL	81	360	821	2788	1714	5763

OWNERS - EXCESS STANDARD VACANT (2)

VALUE	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $20,000	0	236	3256	2136	30	5658
$20,00 TO 34,999	0	64	2200	3281	45	5590
$35,000 AND ABOVE	0	0	9	5	0	14
TOTAL	0	300	5465	5422	75	11262

OWNERS - ABAG DERIVED TOTAL

CONVERSION MATRIX (PERCENTAGES)

OWNERS - NO BEDROOMS

VALUE	ROOMS 1	2	3	4	5	6+
LESS THAN $20,000	100.00	17.78	1.36	0.	0.	0.
$20,00 TO 34,999	100.00	16.57	.66	0.	0.	0.
$35,000 AND ABOVE	100.00	11.45	1.09	0.	0.	0.

OWNERS - ONE BEDROOM

VALUE	ROOMS 1	2	3	4	5	6+
LESS THAN $20,000	0.	82.22	79.57	12.54	1.56	.66
$20,00 TO 34,999	0.	83.43	68.68	7.87	1.14	.27
$35,000 AND ABOVE	0.	88.55	75.93	15.67	2.79	.29

OWNERS - TWO BEDROOMS

VALUE	ROOMS 1	2	3	4	5	6+
LESS THAN $20,000	0.	0.	19.07	83.35	49.53	12.55
$20,00 TO 34,999	0.	0.	30.75	84.16	39.36	6.96
$35,000 AND ABOVE	0.	0.	22.98	79.67	59.88	6.38

OWNERS - THREE BEDROOMS

VALUE	ROOMS 1	2	3	4	5	6+
LESS THAN $20,000	0.	0.	0.	4.11	48.20	69.74
$20,00 TO 34,999	0.	0.	0.	7.97	58.69	63.20
$35,000 AND ABOVE	0.	0.	0.	4.66	35.89	43.88

OWNERS - FOUR OR MORE BEDROOMS

VALUE	ROOMS 1	2	3	4	5	6+
LESS THAN $20,000	0.	0.	0.	0.	.69	17.05
$20,00 TO 34,999	0.	0.	0.	0.	.81	29.57
$35,000 AND ABOVE	0.	0.	0.	0.	1.44	49.46

SECOND ESTIMATE OF BAY AREA HOUSING NEED, 1970 FOR THE ABAG DERIVED TOTAL

ASSOCIATION OF BAY AREA GOVERNMENTS

SEPTEMBER 1975

NOTE 1. - THE GROSS RENT CATEGORIES DO NOT INCLUDE UNITS CLASSIFIED AS PAYING -NO CASH RENT-.

NOTE 2. - THE DECIMAL PART OF THE VALUES IN THE TABLES IS NOT PRINTED. AS A RESULT, THERE WILL BE ROUND-OFF ERROR IN THE TOTALS.

RENTERS - ABAG DERIVED TOTAL

RENTERS - EXISTING UNIVERSE MATRIX

	ROOMS						
GROSS RENT	1	2	3	4	5	6+	TOTAL
LESS THAN $100	36090	31677	42792	29302	13059	5552	158472
$100 TO 199	14531	47406	134184	150142	74284	32659	453266
$200 AND ABOVE	1521	3276	10406	27526	29126	31859	103714
TOTAL	52142	82419	187382	206970	116469	70070	715452

RENTERS - EXISTING UNIVERSE MATRIX

	BEDROOMS					
GROSS RENT	0	1	2	3	4+	TOTAL
LESS THAN $100	46237	69005	31339	9866	2025	158472
$100 TO 199	32228	183111	182254	48517	7156	453266
$200 AND ABOVE	2066	14687	41811	34861	10290	103714
TOTAL	80530	266803	255404	93244	19471	715452

RENTERS - ABAG DERIVED TOTAL

BASIC MATRICES, GROUP 1

RENTERS - STD / OVCR (HH)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	0	956	1026	1509	1685	4010	9186
$100 TO 199	0	2001	2342	3322	6940	13409	28014
$200 AND ABOVE	0	170	158	491	585	4069	5473
TOTAL	0	3127	3526	5322	9210	21488	42673

RENTERS - STD / OVCR (HU)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	1211	1427	1967	2052	1882	647	9186
$100 TO 199	2469	3156	4462	8496	6752	2679	28014
$200 AND ABOVE	214	201	549	659	1866	1984	5473
TOTAL	3894	4784	6978	11207	10500	5310	42673

RENTERS - OCCUPIED STANDARD (TOTAL)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	10795	23522	34046	23758	10757	4438	107316
$100 TO 199	11646	42534	119343	133666	66583	29032	402804
$200 AND ABOVE	1199	3063	9474	24525	26982	30103	95346
TOTAL	23640	69119	162863	181949	104322	63573	605466

RENTERS - STD / N.OVCR (HU)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	9584	22095	32079	21706	8875	3574	97913
$100 TO 199	9177	39378	114881	125170	59831	26686	375123
$200 AND ABOVE	985	2862	8925	23866	25116	28559	90313
TOTAL	19746	64335	155885	170742	93822	58819	563349

NOTE 1. - THE ABOVE BASIC MATRICES ARE PRESENTED AFTER THE APPLICATION OF THE OVERCROWDING CORRECTION PROCEDURE FOR UNITS OF SIX OR MORE ROOMS.

NOTE 2. - THE BASIC MATRIX -STD/N.OVCR (HH)- IS NOT PRESENTED BECAUSE IT DOES NOT PLAY A ROLE IN FURTHER CALCULATIONS.

RENTERS - ABAG DERIVED TOTAL

BASIC MATRICES, GROUP 2

RENTERS - SUB / OVCR (HH)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	0	1167	541	637	461	1172	3978
$100 TO 199	0	191	249	342	889	2128	3799
$200 AND ABOVE	0	22	0	0	20	136	178
TOTAL	0	1380	790	979	1370	3436	7955

RENTERS - SUB / OVCR (HU)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	1490	705	741	645	319	78	3978
$100 TO 199	373	468	760	1132	798	268	3799
$200 AND ABOVE	42	24	0	0	42	70	178
TOTAL	1905	1197	1501	1777	1159	416	7955

RENTERS - OCCUPIED SUBSTANDARD (TOTAL)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	21284	6454	6230	3792	1607	822	40189
$100 TO 199	1704	2571	8659	9303	5272	2675	30184
$200 AND ABOVE	245	47	218	699	906	933	3048
TOTAL	23233	9072	15107	13794	7785	4430	73421

RENTERS - SUB / N.OVCR (HU)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	19794	5749	5489	3147	1288	744	36211
$100 TO 199	1331	2103	7899	8171	4474	2407	26385
$200 AND ABOVE	203	23	218	699	864	863	2870
TOTAL	21328	7875	13606	12017	6626	4014	65466

RENTERS - SUB / N.OVCR (HH)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	28713	4521	1749	842	292	94	36211
$100 TO 199	8766	8098	5481	2541	1149	350	26385
$200 AND ABOVE	527	904	821	423	214	181	2870
TOTAL	38006	13523	7851	3806	1655	625	65466

NOTE 1. - THE ABOVE BASIC MATRICES ARE PRESENTED AFTER THE APPLICATION OF THE OVERCROWDING CORRECTION PROCEDURE FOR UNITS OF SIX OR MORE ROOMS.

RENTERS - ABAG DERIVED TOTAL

BASIC MATRICES, GROUPS 3, 4, 5 AND 6

RENTERS - STD / VACANT (HU)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	819	1289	2276	1545	650	244	6823
$100 TO 199	862	2185	5863	6935	2300	876	19021
$200 AND ABOVE	40	148	705	2272	1222	782	5169
TOTAL	1721	3622	8844	10752	4172	1902	31013

RENTERS - SUB / VACANT (HU)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	3192	412	240	207	45	48	4144
$100 TO 199	319	176	319	238	129	76	1257
$200 AND ABOVE	37	18	9	30	16	41	151
TOTAL	3548	606	568	475	190	165	5552

RENTERS - STD / OVPY (HH)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	5745	11580	16939	9298	3659	830	48051
$100 TO 199	6555	22727	57161	57928	25084	11277	180732
$200 AND ABOVE	747	1628	4959	12443	12962	14526	47265
TOTAL	13047	35935	79059	79669	41705	26633	276048

RENTERS - SUB / OVPY (HH)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	9663	3024	2518	1546	441	110	17302
$100 TO 199	976	1266	4704	4424	2038	1264	14672
$200 AND ABOVE	209	0	176	389	556	636	1966
TOTAL	10848	4290	7398	6359	3035	2010	33940

RENTERS - ABAG DERIVED TOTAL

RENTERS - STANDARD HOUSING RESOURCE

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	2030	2716	4243	3597	2532	891	16009
$100 TO 199	3331	5341	10325	15431	9052	3555	47035
$200 AND ABOVE	254	349	1254	2931	3088	2766	10642
TOTAL	5615	8406	15822	21959	14672	7212	73686

RENTERS - HOUSING UNITS REQUIRED FOR HOUSEHOLDS INADEQUATELY HOUSED

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	28715	6644	3316	2988	2438	5276	49375
$100 TO 199	8766	10290	8072	6205	8978	15887	58198
$200 AND ABOVE	527	1096	779	914	819	4386	8521
TOTAL	38006	18030	12167	10107	12235	25549	116094

RENTERS - SUBSTANDARD OCCUPIED, 1970

GROSS RENT	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $100	23283	11236	4084	1291	295	40189
$100 TO 199	2687	11441	11847	3629	580	30184
$200 AND ABOVE	254	314	1134	1045	302	3048
TOTAL	26224	22990	17065	5965	1177	73421

RENTERS - SUBSTANDARD VACANT, 1970

GROSS RENT	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $100	3315	564	196	52	17	4144
$100 TO 199	381	454	310	95	16	1257
$200 AND ABOVE	39	27	38	34	13	151
TOTAL	3736	1045	544	181	46	5552

RENTERS - HOUSEHOLDS OVERPAYING, 1970

GROSS RENT	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $100	20079	30770	11406	2728	370	65353
$100 TO 199	16371	84250	73841	18204	2738	195404
$200 AND ABOVE	1226	7134	19574	16403	4894	49231
TOTAL	37675	122153	104821	37336	8003	309988

RENTERS - ABAG DERIVED TOTAL

RENTERS - ADEQUATELY HOUSED, 1970

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	9584	22095	32079	21706	8875	3574	97913
$100 TO 199	9177	39378	114861	125170	59831	26686	375123
$200 AND ABOVE	985	2862	8925	23866	25116	28559	90313
TOTAL	19746	64335	155865	170742	93822	58819	563349

RENTERS - MATCHED HOUSING NEED

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	2030	2716	3316	2988	2438	891	14379
$100 TO 199	3331	5341	8072	6205	8978	3555	35482
$200 AND ABOVE	254	349	779	914	819	2766	5881
TOTAL	5615	8406	12167	10107	12235	7212	55742

RENTERS - UNMATCHED HOUSING NEED

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	26683	3928	0	0	0	4385	34996
$100 TO 199	5435	4949	0	0	0	12332	22716
$200 AND ABOVE	273	747	0	0	0	1620	2640
TOTAL	32391	9624	0	0	0	18337	60352

RENTERS - EXCESS STANDARD VACANT (1)

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	0	0	927	609	94	0	1630
$100 TO 199	0	0	2253	9226	74	0	11553
$200 AND ABOVE	0	0	475	2017	2269	0	4761
TOTAL	0	0	3655	11852	2437	0	17944

RENTERS - ABAG DERIVED TOTAL

RENTERS - NEW UNIVERSE OF OCCUPIED UNITS

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	38297	28739	35335	24694	11313	8850	147288
$100 TO 199	17943	49668	122953	131375	68809	42573	433321
$200 AND ABOVE	1512	3958	9704	24780	25935	32945	98834
TOTAL	57752	82365	168092	180849	106057	84368	679443

RENTERS - MOBILITY VACANT NEED

GROSS RENT	ROOMS 1	2	3	4	5	6+	TOTAL
LESS THAN $100	1805	1354	1668	1164	533	417	6940
$100 TO 199	845	2340	5794	6190	3242	2006	20418
$200 AND ABOVE	71	187	457	1168	1222	1552	4657
TOTAL	2721	3881	7919	8522	4997	3975	32016

RENTERS - ABAG DERIVED TOTAL

RENTERS - ADEQUATELY HOUSED, 1970

GROSS RENT	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $100	16723	50414	22814	6652	1310	97913
$100 TO 199	23921	155118	150869	39373	5841	375123
$200 AND ABOVE	1459	12686	36247	30706	9215	90313
TOTAL	42103	218219	209929	76731	16367	563349

RENTERS - MATCHED HOUSING NEED

GROSS RENT	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $100	2890	5802	3660	1697	330	14379
$100 TO 199	5198	12387	11082	5430	785	35482
$200 AND ABOVE	308	1005	1601	2088	878	5881
TOTAL	8397	19194	16343	9215	1993	55742

RENTERS - UNMATCHED HOUSING NEED

GROSS RENT	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $100	27795	2947	540	2265	1449	34996
$100 TO 199	7032	3547	2415	7218	2503	22716
$200 AND ABOVE	372	656	147	355	510	2640
TOTAL	35199	7150	3102	10438	4462	60352

RENTERS - MOBILITY VACANT HOUSING NEED

GROSS RENT	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $100	2208	1805	714	439	144	5310
$100 TO 199	1664	4905	2584	2319	430	11901
$200 AND ABOVE	96	169	141	915	489	1810
TOTAL	3968	6879	3439	3673	1063	19021

RENTERS - EXCESS STANDARD VACANT (2)

GROSS RENT	BEDROOMS 0	1	2	3	4+	TOTAL
LESS THAN $100	0	0	0	0	0	0
$100 TO 199	0	560	2423	52	0	3036
$200 AND ABOVE	0	151	1180	573	9	1914
TOTAL	0	712	3603	625	9	4950

RENTERS - ABAG DERIVED TOTAL

CONVERSION MATRIX (PERCENTAGES)

RENTERS - NO BEDROOMS

GROSS RENT	ROOMS 1	2	3	4	5	6+
LESS THAN $100	100.00	28.32	2.75	0.	0.	0.
$100 TO 199	100.00	32.28	1.77	0.	0.	0.
$200 AND ABOVE	100.00	13.22	1.07	0.	0.	0.

RENTERS - ONE BEDROOM

GROSS RENT	ROOMS 1	2	3	4	5	6+
LESS THAN $100	0.	71.68	89.52	24.23	5.56	2.98
$100 TO 199	0.	67.72	89.19	18.46	4.11	1.59
$200 AND ABOVE	0.	86.78	70.21	13.36	2.43	.48

RENTERS - TWO BEDROOMS

GROSS RENT	ROOMS 1	2	3	4	5	6+
LESS THAN $100	0.	0.	7.73	72.99	45.65	12.32
$100 TO 199	0.	0.	9.04	79.83	59.06	19.59
$200 AND ABOVE	0.	0.	28.71	83.27	44.69	9.06

RENTERS - THREE BEDROOMS

GROSS RENT	ROOMS 1	2	3	4	5	6+
LESS THAN $100	0.	0.	0.	2.79	47.33	51.65
$100 TO 199	0.	0.	0.	1.71	36.12	58.53
$200 AND ABOVE	0.	0.	0.	3.38	51.99	58.97

RENTERS - FOUR OR MORE BEDROOMS

GROSS RENT	ROOMS 1	2	3	4	5	6+
LESS THAN $100	0.	0.	0.	0.	1.46	33.04
$100 TO 199	0.	0.	0.	0.	.71	20.30
$200 AND ABOVE	0.	0.	0.	0.	.89	31.49

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